COMPUTERWORLD

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NEWSPAPER

OS-to-DOS Move Pulled Off Without Experienced Staffers

By Rita Shoor
CW Staff

KANSAS CITY, Mo. — National Dealer Service (NDS) here installed its first computer, converted some 150 application programs running under OS to execute under DOS/VSE and installed five additional system software products in approximately six months.

And the job was done without an experienced systems programmer or any computer operators, according to Dick Paste, systems and programming manager.

When NDS management decided to switch from buying time on an IBM 370/158 with an OS environment to installing an in-house IBM 4331 processor, the DP staff consisted of three programmer/analysts, Paste himself and the vice-president of DP, Dwight Pope. "Our first inclination was to go out and hire an expensive software person," he said, since none of the staff had any background in systems programming or technical support.

He estimated that an experienced systems programmer might cost NDS up to $30,000, including company benefits and costs based on the market value in the Kansas City area.

The staff's lack of systems software-related experience was compounded by the fact that pro-

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Software Survey Finds Users Tough Customers, Apt to Switch Vendors

By Bruce Hoard
CW Staff

Most packaged software performs just as the vendor promised "immediately," according to 76% of the 2,140 respondents in a recent survey.

Datapro Research Corp.'s eighth annual "User Ratings of Proprietary Software" reflected harsh scrutiny by users and a willingness to abandon computer vendors in favor of independent offerings.

Respondents were asked to evaluate their packages from several points of view, including cost, reliability and overall satisfaction. The bulk of the ratings were for utility packages rather than applications, probably because many utility-oriented DP managers have more experience with them than with applications.

Just over 80% of the respondents rated savings in human resources as the biggest advantage gained from their packages. Those savings hold a decided lead over flexibility, the advantage found by 69.2% of the survey respondents. Those two leaders are followed by capabilities, simplicity, system resource savings and "inexpensive" as the top advantage.

In the liabilities column, 24.5% cited complexity as the No. 1 disadvantage. Excessive use of resources (21.7%) was next on the negative list, followed by package-was-too-slow, package-was-too-costly, package-lacks-key-compatibilities, package-inflexible and package-not-compatible categories. The 2,140 respondents provided a total of 3,853 ratings.

Four packages stood out above all others. They are Flee/Flim, a replacement for the IBM library maintenance

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NBS/Sutron Corp. Effort

Flexible Media Standards Planned

By Tim Scannell
CW Staff

FAIRFAX, Va. — The National Bureau of Standards (NBS) is currently working with an engineering research and development firm here to develop flexible disk media standards that could have a far-reaching impact on both the data processing and word processing communities.

Barring any unforeseen difficulties or surge of opposition, the media rules could be implemented by mid-1982.

The planned standards — which basically concern how data is formatted and recorded on a floppy disk — could save the government more than $80 million in computer equipment over the next five years, according to two yet-to-be-released reports compiled by Sutron Corp. Standardization would cut costs by allowing the government to competitively acquire computing gear rather than be locked into a particular vendor's data format, Gene Dickamore, director of the firm's Computer Systems Division, said.

However, a number of machine vendors — mostly those in the word processing sector — are vehemently opposed to the adoption of an NBS-sanctioned flexible media standard. Their argument is that an across-the-board media standard would not only cool down the heated battle between vendors for "locked-in" users, but could eventually run some companies out of the business.

"We found pretty much that there is

(Continued on Page 6)

FCC Approves Final Text on Inquiry II

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — The final text of the Federal Communications Commission's (FCC) "final" Second Computer Inquiry Decision was approved by the commissioners last week, but it is virtually certain not to be the last word on the subject.

AT&T already has announced plans to seek judicial review of a key section of the order, which either destroys or reinterprets the company's 1956 Consent Decree, depending on one's point of view. And several of Bell's competitors, notably including vendors of computer-based information services, have asked the U.S. Court of Appeals for the District of Columbia to review the entire decision.

As finally approved by the FCC, the decision requires AT&T to market "enhanced" — i.e. computer-based — services through one or more separate subsidiaries. The operating companies, under this scheme, are limited to "basic" services — essentially transmission facilities priced on the basis of tariffs and subject to continued commission regulation. There are some exceptions, however. AT&T can apply for a waiver, permitting it to offer an enhanced service through an operating company.

Many of Bell's competitors strongly oppose the waiver provision, claiming it will lead to surreptitious cross-subsidies and enable the phone company to drive other vendors of similar services out of the market. This threat now may be even greater, for at last week's FCC meeting, the waiver provision was broadened — thanks largely to Commissioner Joseph Fogarty.

Because of his efforts, the record of the proceeding will show explicitly that AT&T can be granted a waiver whenever the FCC decides that offering the service through a separate subsidiary would impose "unreasonable costs" on AT&T or its customers, be

(Continued on Page 4)

Upkeep Costs Expected to Rise 22%/Year

By Marcia Blumenthal
CW Staff

SAN JOSE, Calif. — With software and hardware maintenance already claiming 40% of the average DP department budget, the prospect of paying more for this item is bitter medicine for users to swallow. Yet they will be doing just that during the next five years.

Users' expenditures for maintenance are forecast to increase annually by 22% until 1985 and then gradually diminish to 18% yearly for the rest of the decade, according to a recent study published by Strategic Business Services, Inc. These expenses are growing faster than all other major segments of DP expenditures.

IBM has set the pace in charging for maintenance — especially software maintenance that previously was included at no charge — and shifting the burden of problem identification to the user, the study observed.

But while the short-term outlook for maintenance costs is bleak, users could benefit from this trend in the long run. Quick response on calls to remote diagnostic centers can save time by eliminating a wait from a local program service representative.

And, when users are required to pay for maintenance, they will begin demanding highly maintainable software

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SEASON'S GREETINGS

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Runs in IBM 3705 Controller

Package Helps Tie X.25, SNA Nets

By Brad Schultz
CW Staff

MANHATTAN BEACH, Calif. — A software package that smooths out the tortuous road between IBM's Systems Network Architecture (SNA) and the public packet networks was announced here last week by Comm-Pro Associates.

Data must travel that road for IBM users to employ large-scale packet-switching, a means of optimizing communication over hundreds of miles that breaks messages into small pieces and reassembles them at the destination.

SNA has yet to meet the X.25 de facto standard for interfacing data terminal equipment to packet nets, but Comm-Pro's revised X.25 Network Access Software (NAS) makes the point academic, a spokesman claimed.

Interactive Operation

The package allows interactive asynchronous terminals not made by IBM that are plugged into X.25 networks to act, from the standpoint of IBM mainframes, as if they were IBM terminals designed to work under SNA.

To do this, the new NAS runs in IBM's 3705 controller, which front-ends IBM mainframes in an SNA environment. The package is an extension of IBM's Network Control Program (NCP). In conjunction with NCP's Network Terminal Option, the Comm-Pro product would reroute present connections between interactive asynchronous terminals and X.25 networks.

The resulting "multidomain SNA network" could accommodate more remote hosts than ever, the spokesman said.

Also, the NAS package allows programmers to avoid worrying about whether their applications pertain to NCP and allied software or IBM's Emulator Program (EP), which controls an older generation of software. Presently, programmers employed by IBM customers must figure out when to shift from NCP to EP or the reverse, the spokesman explained, but the Comm-Pro package can automatically make that decision and execute it.

Package Options

Options include an X.25 call-out facility, which the user can use to open channels to a public packet net by engaging EP software. This replaces telephone dialing digits, the spokesman said, with I/O commands, allowing terminal operators to establish a virtual phone circuit between two host systems in which one host acts as an application program and the other host as an interactive asynchronous terminal.

> *'The package allows interactive asynchronous terminals not made by IBM that are plugged into X.25 networks to act, from the standpoint of IBM mainframes, as if they were IBM terminals designed to work under SNA.'*

As a result, connect-time is trimmed and throughput raised, the spokesman asserted. A single X.25 access line opened by the NAS package reportedly can eliminate a need for individual low-speed lines and modems. Besides reaching public packet nets, this X.25 pathway can reach single-end X.25 statistical multiplexers.

The Comm-Pro package also supports Bell Canada's Datapac 3303 end-to-end protocol for IBM 3270 terminals. This protocol requires that nodes of the Datapac network act as remote hosts for 3270s, the spokesman explained.

Only data packets pass between the nodes and the 3705 controller under the Datapac-compatible NAS, he stated, and different terminals on the same cluster can access different hosts connected to Datapac.

The current release of NAS was said to allow network 3270s to selectively access different EP applications, but subsequent releases are projected to extend support to NCP applications as well.

IBM to Follow Suit?

Will IBM itself add something like NAS to its SNA library next year? According to a Comm-Pro partner, IBM may well be working on some method for working X.25 compatibility into the vendor's network architecture, but probably something different from Comm-Pro's tactic of revising the 3705-resident NCP.

A specialist in 3705 software since 1973, Comm-Pro has written some of the packages sold by IBM — Extended Features Program Request per Price Quotation (PRPQ), for example — but IBM, under pressure to meet X.25 in the U.S., has not tapped Comm-Pro for the job, *Computerworld* was told.

Overseas, IBM does offer a device for fitting SNA installations to the X.25 networks in some countries, the Comm-Pro official noted, but rather than offer that 3705 attachment domestically, IBM may choose to redefine the path control section of its SNA design.

The basic NAS package requires at least 26K bytes of storage in the 3705 along with the capacity demanded by EP, or the Partitioned Emulator Program (PEP) that contains NCP and EP. The package leases for $600/month with EP or $800/month with PEP, but may be tried out for free.

Comm-Pro's address is Suite 700, 638 Fourteenth St., Manhattan Beach, Calif. 90266.

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Excerpts From Computer Inquiry Decision

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — Following are excerpts from the final text of the Federal Communications Commission's (FCC) Computer Inquiry Decision, as proposed by the commission's staff. The commissioners approved this version after making some minor editorial changes.

"As presently structured, Dial-It and Custom Calling II constitute enhanced services under our Final Decision. [To classify them as basic services] as suggested by AT&T and GTE . . . would undermine any workable demarcation as to the boundary between basic and enhanced services . . . AT&T's attempts to classify these services as basic by analogizing to its time and weather recordings must also be rejected.

"[Regarding the argument that] certain services should be provided as part of an integrated basic transmission network . . . to be efficiently offered or ubiquitously available . . . we conclude that evidence has not been presented that warrants such a determination.

"It is not our desire to impose significantly increased costs upon consumers . . . to preserve the integrity of structural separation . . . The merits of any waiver required for existing or future services must be premised on the existence of the separate subsidiary and its computer facilities, and must include not only the costs of not waiving the separate facilities requirement but also the potential for cross-subsidization and other anticompetitive effects.

"Evidence is lacking to support the proposition that protocol conversion must be performed as part of a basic service . . . Users are able to choose among an increasing number of alternatives . . . for performance of all levels of protocol conversion. These include providers of enhanced services, equipment manufacturers and firms that provide specialized protocol converters.

"We do not intend to imply that we would not consider granting a waiver of the [requirement that AT&T's subsidiary can't own transmission facilities] . . . In determining whether to grant such requests, we will weigh the preferred justification against . . . the counter-vailing regulatory considerations.

". . . Some restrictions on joint software development are essential . . . The best resolution . . . is to . . . [require] the separated subsidiary or its outside contractors to perform all software development, including firmware . . . The subsidiary may purchase any equipment its parent sells to the general trade so long as any software or firmware contained therein . . . is generic, (i.e.) contained, in standard form, within equipment . . . sold 'off the shelf' to any interested purchaser.

"We do not believe . . . additional information flow restrictions are warranted between entities affiliated with separate subsidiaries . . . The Final Decision sets forth in unambiguous terms . . . that network information must be disclosed to competitors of the subsidiaries at the same time and under the same terms and conditions as it is disclosed to the subsidiaries . . . We will extend [this] requirement to all carriers owning basic transmission facilities . . . insofar as such information affects either intercarrier interconnection or the manner in which interconnected customer-provided terminal equipment operates."

FCC Approves Final Text on Inquiry II

(Continued from Page 1)

"technologically impossible," involve "transitional factors" or conflict with "national security considerations."

The services most affected by this language are those the phone company plans to offer in the near future. Since Bell does not have to establish a separate subsidiary until March 1982, these services could be delayed without some means of waiving the requirement. Essentially, that's what Fogarty engineered last week by making "transitional factors" a basis for granting a waiver.

If AT&T can show the transition to a separate subsidiary will delay implementation of a new enhanced service, despite an immediate demand, the commission now has an explicit basis for allowing the service to be offered by a telephone operating company *before* the subsidiary is established. And since "unreasonable costs" represent one of the other bases for granting a waiver, AT&T may be able to continue offering such services through an operating company indefinitely by showing that transferring the offering to a subsidiary would be too costly.

Custom Calling II

Custom Calling II, a voice-based store-and-forward message service recently developed by Bell, appears to be the chief reason for this "clarification" of the Computer Inquiry Decision.

Custom Calling II threatens to put most of the nation's telephone answering services out of business; it also promises to be a relatively cheap alternative to the electronic mail services which many AT&T competitors are now offering and/or developing.

Their chief selling point is that they eliminate the time and expense of recalling when the party at the other end is unavailable; Custom Calling II, by storing messages within the network in easily accessible form, provides the same benefit.

Currently, Bell operating companies in New York, Texas, Illinois, Indiana, Wisconsin, Ohio and several other states are planning to tariff the new service, according to AT&T Vice-President James Billingsley. They're waiting for approval of the first Custom Calling II tariff, filed several months ago by Bell Telephone Co. of Pennsylvania. The Pennsylvania Public Utilities Commission (PUC) has deferred final action, pending the outcome of an investigation requested by the telephone answering service industry.

(Recently, a PUC administrative law judge recommended that the Pennsylvania commission allow the service to go into commercial operation. The commissioners are likely to act within the next few weeks).

A key objection of the telephone answering industry is that allowing Pennsylvania Bell to offer Custom Calling II would violate the separation of basic and enhanced services specified in the original "final" Computer Inquiry Decision handed down last April. The FCC's latest clarification of its waiver policy, however, appears at the very least to weaken that objection.

The FCC also clarified several other parts of the decision last week.

General Telephone and Electronics will not have to offer enhanced services through a separate subsidiary, but whether the company can absorb its recently acquired Telenet subsidiary must await the outcome of a related proceeding that deals with the merger agreement negotiated between the two companies.

AT&T's separate subsidiaries will not be able to own transmission facilities, but the subsidiaries can own "facilities for the provision of service among multiple buildings at a common business location." In other words, they can provide local-area networks.

The commission also reaffirmed its authority to regulate the structure of communication common carriers — meaning it retains the power to control AT&T's separate subsidiaries — but left open the extent of this power.

Although the decision leaves a lot of loose ends and could be further modified in court, it's nevertheless an important development in the 12-year struggle to divvy up markets between Bell and the computer industry. It could precipitate a final answer to the basic question of whether, and how, the phone company can offer enhanced services.

The decision allows the company to offer enhanced services on a deregulated basis, but AT&T's 1956 Consent Decree appears to prohibit such activity. Although the FCC and AT&T insist there is no conflict because enhanced services, as defined in the decision, are "incidental to" communications and thus explicitly permitted by the decree, several others — including the Department of Justice — oppose this interpretation.

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Former Exxon Manager Pleads Guilty to Mail Fraud

By Marguerite Zientara
CW Staff

PHILADELPHIA — A former Exxon Corp. employee has pleaded guilty to trying to sell IBM detailed plans for Exxon's as yet unreleased Hornet line of information processing products [CW, Sept. 8].

Orion N. Briel, a former manager of marketing publications for QYX, the Exxon division developing the Hornet system, pleaded guilty Nov. 25 in U.S. District Court here to one count of mail fraud in offering IBM the plans by mail, according to an assistant to U.S. Attorney Peter Vaira.

According to reports pieced together at the time of Briel's arrest, he resigned from QYX on Aug. 13 and the next day mailed a certified letter to Dan McGlaughlin, vice-president of marketing for IBM's Franklin Lakes, N.J., office, offering the plans.

McGlaughlin contacted Exxon, which contacted the Federal Bureau of Investigation, investigators found. On Aug. 22, McGlaughlin telephoned Briel, who then reportedly repeated his offer to negotiate the transaction.

Five days later, the FBI agent and an Exxon engineer, both posing as IBM representatives, met Briel at a hotel in King of Prussia, Pa. Briel presented the two men with detailed plans and specifications for the Hornet product line and other products and asked $100,000 for the information, according to investigators.

The plans had been previously reported missing from a desk and cabinet at QYX headquarters in Lionville, Pa., by an Exxon security official.

Sentencing is expected to take place the week of Jan. 5, according to the U.S. Attorney's office.

Claims Laws Backed its Actions

AT&T Files Pretrial Brief in Antitrust Case

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — AT&T insists that federal and state regulators approved, or at least condoned, its conduct during the 1960s and '70s and therefore, the company is not guilty of violating the Sherman Antitrust Act, as charged by the government.

Even if the court concludes otherwise, however, the government's proposal to break up the Bell System isn't even "remotely" justified because it would "restructure the enterprise . . . in ways that are unrelated" to Bell's liability.

This is the gist of a 272-page pretrial brief AT&T submitted to the U.S. District court for the District of Columbia early this month. Together with a similar brief submitted by the Justice Department, AT&T's filing describes the major issues that will be argued during the oral part of the trial, which begins next month.

The case is possibly even more important than the government's still-pending prosecution of IBM — partly because of the growing importance of communications to computer operations, and partly because the U.S. vs. AT&T, Western Electric and Bell Telephone Laboratories suit will impact current efforts in Congress to draft a new telecommunications policy.

Major Contention

In its pretrial brief, the Justice Department attempts to rebut AT&T's major contention by pointing out that "none of the conduct . . . relied upon by the government to show illegal monopolization was compelled by regulation or even approved as being consistent with the public interest. In fact, much of the challenged conduct ultimately was specifically disapproved by the Federal Communications Commission (FCC) or the courts.

The remainder was either unreachable under the Communications Act or . . . was . . . unreviewable by the FCC or other agencies due to AT&T's control of the available information."

Regarding the need for divesting AT&T of its key parts, Justice contended it's the only way to prevent continued abuse of the phone company's monopoly power.

"The Supreme Court has consistently ruled that the optimal remedy for persistent monopoly is structural relief," Justice pointed out, adding that "we will show that any internal restructuring in response to the [Second Computer Inquiry] decision is not likely to alleviate effectively the anticompetitive nature of AT&T's structure."

Connecting Arrangements

Both sides seem to agree that the case hinges on the phone company's actions during a roughly 10-year period that began in 1968 with the FCC's Carterfone Decision, which allowed users to interconnect "foreign attachments" — independently made terminal equipment — to the dial-up telephone network.

According to the government, however, the requirements for "connecting arrangements" which Bell cranked into its tariffs in the wake of Carterfone represents a major illustration of how AT&T used its monopoly position to curb competition illegally.

Since virtually all local loops were owned and operated by Bell operating companies, a user was forced to rent connecting arrangements on Bell's terms. Ostensibly, the connecting arrangement was needed to prevent improperly designed on manufactured foreign attachments from disrupting service.

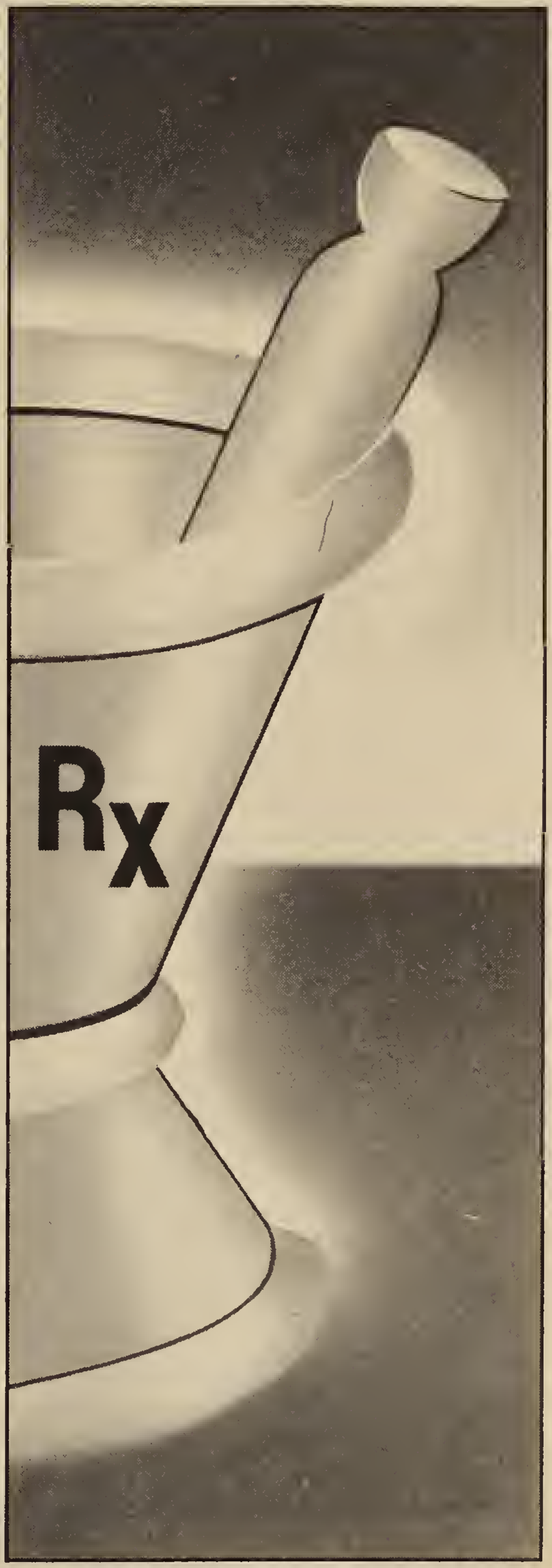
However, according to the Justice Department, they were "overly designed, overly complex and consequently overly expensive. In some cases . . . the monthly and installation charges for connecting arrangements were more costly than the terminal equipment itself."

According to AT&T, however, the Carterfone Decision was one of a series of regulatory actions that ushered in "a prolonged period of uncertainty and debate" regarding the proper method of pricing communication services, the need for protecting the telephone network's level of service and the desirability of competition. State regulators "vigorously opposed" the FCC's regulatory policies.

Underlying this contention are two legal principles, allegedly supported by multiple judicial decisions, which Bell will lean on heavily.

One principle is that regulated enterprises are immune from antitrust prosecution "with respect to conduct . . . basic to the pervasive scheme of regulation to which they are subject." The other is a "rule of reason" which says, according to AT&T, that "where the conduct involved is subject to extensive regulation . . . the nature and effect of that regulation must be taken into account in determining whether a defendant has engaged in conduct violative of the Sherman Act.

Because of these court precendents, combined with regulatory history during the 10 years following the Carterfone Decision, many of the government's antitrust charges must be dismissed, Bell said.



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• IBM Offers Pre-System/38 Program Conversion

By Bruce Hoard
CW Staff

BOCA RATON, Fla. — Users with IBM System/38s on order can now have their new computers without having them. All they need do is subscribe to IBM's System/38 Remote Testing Service.

The Remote Testing Service enables customers to convert existing programs and develop and test new applications prior to the installation of their System/38s — all this within the confines of the user's premises.

What the user needs is a CRT terminal and a matrix printer. IBM supplies the communications line, modem, technical support and services and delivers 4,800 bit/sec. The price: $1,750 a month, according to Ed Matthys, manager, Market Support Center for IBM's General Systems Division.

The user is tied to a System/38 at the test center headquarters in Atlanta. He can perform all his conversion and testing tasks from his terminal as though the machine was sitting in his own computer room.

However, conversion and testing is all the user is allowed. "We're not running a service bureau," Matthys commented.

In order to use the service, the user sends the Atlanta facility diskettes or magnetic tapes containing programs, test files or output from IBM System/3 batch conversion utilities. They are then loaded on the System/38 at the test center and compiled. The diskettes and tapes are then returned to the users.

The service was started as an aid to the first three System/38 field test customers. They liked it so much, the company put together a pilot project. It too was a success.

Available since last September, the service now has some 100 users and may be accessed for up to six hours daily between 8 a.m. and 8 p.m., Matthys said. The six hours do not have to be contiguous and users may alter their times to accommodate openings in the schedule.

Three Options

There are three user options when dealing with the service, he explained. Customers may signal that (1) they can't go on without help; (2) they would like someone to contact them before the day is out; and (3) they would like to consult with somebody at IBM's convenience.

There is also a question and answer file that lists queries made by users and the answers supplied by IBM.

There is a 30-day minimum usage and a 30-day cancellation notification requirement. The service must be discontinued within 30 days after installation of the System/38.

The number of System/38s IBM maintains in Atlanta to facilitate the service will rise in proportion to the demand for service, the manager said, adding no one will be refused. Anyone interested should contact his local IBM sales representative.

Amdahl Charged With Manslaughter

By Jeffry Beeler
CW West Coast Bureau

PALO ALTO, Calif. — Amdahl Corp. founder Dr. Eugene M. Amdahl faces a misdemeanor manslaughter charge after allegedly striking a local motorcyclist in a fatal Nov. 17 traffic accident.

The charge against Amdahl, 58, is contained in a complaint authorized by the Santa Clara County district attorney's office and filed Dec. 15 in Municipal Court here.

The complaint, which reportedly prompted the district attorney's office to issue a Dec. 15 warrant for Amdahl's arrest, charges the defendant with killing Manuel Turner Jr., a 57-year-old Silicon Valley engineer, while driving a car.

Amdahl will have "two weeks or so" to surrender himself voluntarily to law enforcement authorities and set a date for formal arraignment, according to a spokesman for the district attorney's office.

Involved in New Venture

The order for Amdahl's arrest comes only months after the internationally recognized engineer and entrepreneur resigned as president of the company that bears his name to start a new venture known as Acsys, which is expected to make advanced, large-scale processors for scientific applications.

Asked how his current legal problems might affect Acsys' future, Amdahl replied, "I don't think there will be much of an effect at all."

The charges facing Amdahl stem from an accident that occurred after Turner, who was riding a motorcycle at the time, stopped at an intersection in nearby Cupertino. Amdahl apparently failed to see the rider on the road ahead, and the car he was driving fatally struck the victim from behind, according to a local spokesman for the California Highway Patrol.

"Some of the evidence gathered in the case thus far suggests that he (Amdahl) was exceeding the speed limit at the time of the accident and failed to heed a traffic signal at the intersection in question," the spokesman said. "That's why a formal charge has been filed against him."

Amdahl was asked for his reaction to the allegations, but he declined comment on the advice of his attorney.

A police investigation immediately following Turner's death cleared Amdahl of any "gross negligence" in the accident and thus permitted his manslaughter charge to be downgraded from a felony to a misdemeanor.

Depending on how Amdahl pleads in the case, the charges against him could either lead to a formal trial or be settled out of court through plea bargaining or other behind-the-scenes legal negotiations.

NBS Developing Flexible Media Standards

(Continued from Page 1)

a real need for interchange standards," Dickamore explained. But, word processing vendors are opposed because "there's a whole lot of dollars to be made in that area. And the best way to maintain a market base is to lock your customers in to a unique format, where they really can't afford to leave you."

Sutron's Computer Systems Division began working with the NBS a little more than a year ago in response to an RFP put out by the government agency. The NBS wanted someone in the user or vendor community to develop labeling and format standards for flexible disks which are said to be heavily used throughout the government.

The standards would govern such characteristics as how many sectors a disk has per track, how many tracks per surface, what kind of controls are in each disk sector and where a user's data field is located on the media. Most importantly, Sutron would standardize disk labels, allowing a variety of machines to read or write to the same disk.

Any standards developed would parallel guidelines established earlier this year by the American National Standards Institute (Ansi), covering the physical and magnetic characteristics of floppy disks, Dickamore stated.

Popular Medium

Sutron officials spent about a year traveling across the country, talking with floppy disk manufacturers, disk drive vendors and people who integrated flexible disk drives into data and word processing systems. What they found was that despite pie-in-the-sky talk about charge-coupled devices (CCD) and bubble memories replacing floppy disks, the medium was extremely popular and would be around for at least five more years.

Sutron also uncovered "some very strong opinions" concerning the pros and cons of a flexible disk media standard, Dickamore claimed. However, he refused to identify any companies that expressed a negative view except to say that most were in word processing.

Based on its research, the five-year-old company compiled two reports which are scheduled to be released sometime next year pending NBS approval. In one of the reports, Sutron reveals that the government could save $39 million on DP and $43 million on word processing equipment — a sizable chunk when you consider that the government will buy about $300 million worth of word processing gear by 1982, according to a Government Accounting Office report released early last year.

Government Go-Ahead

Its appetite wetted by Sutron's financial savings figures, the government has given the company the go-ahead to continue its research and develop acceptable standards.

The firm's initial goal is to have something on paper by July or August 1981. The proposed standards will then be published in the Federal Register where they will be available for review and industry comment. If accepted, they will become a Federal Information Processing Standard (Fips) about a year later, Dickamore said.

This recent standards movement is part of an NBS plan to release a series of information interchange standards over the next four years [CW, Sept. 29]. In addition to flexible disk file formatting rules, the NBS is seeking to formulate a text editing directives standard, text formatting standards and a message processing standard for computer-based message systems.

All of the proposed standards would be aimed at improving computer communications and integration and aiding electronic mail transmissions between automated offices, a government spokesman noted.

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For 'Wasteful Federal Spending'

DOT Driver System 'Wins' Golden Fleece

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — A Department of Transportation (DOT) experimental computer system that gives drivers local travel directions has received the bureaucracy's equivalent of a Bronx cheer — the dreaded "Golden Fleece Award" handed out by Sen. William Proxmire (D-Wis.).

The short-term system, set up for the Washington, D.C., area, provided computer-originated responses to direction inquiries entered by drivers through Touch-Tone telephones. The experiment costs included $241,764 for computer support from a Massachusetts DP services company.

Proxmire's reaction to the project was that "this complex system is no substitute for asking at the nearest gas station." Despite that opinion, the Transportation Department's Federal Highway Administration (FHA), which conducted the experiment, said it would continue with the project.

'Use a Map'

In a statement issued on the December Golden Fleece Award, Proxmire said, "while the system is intended to aid lost motorists and save gasoline, it helps those who need it least. In order to use it, you have to know where you are and where you are going. If you have that much information," Proxmire said, "you can use a map."

The infamous Golden Fleece Award is given, in the official description from Proxmire's office, "to the biggest, most ridiculous or most ironic example of wasteful federal spending for that period."

The tongue-in-cheek tone of the often pun-filled statements accompanying the senator's fleece awards do not hide their serious purpose — to expose waste of taxpayers' dollars.

For this most recent award, Proxmire said, "the effect of this program is to substitute a very sophisticated, overly complex and expensive system for one that is simpler and already available — a map. This is not only paternalistic, but also is an example of technological overkill at its worst."

Ongoing Project

According to Lawrence Powers, chief of the Analysis and Experimentation Group of FHA's Traffic Safety Division, the experiment was to test driver reaction to an automated navigational system and is part of an ongoing project to develop ways to cut down on gasoline wastage and promote traffic safety.

British studies have found, he explained, that about 4% of total driving is wasted, done by "people who are either lost and meandering around trying to find their way to someplace or know where they are going but are not taking the best route."

"If we could recover a fraction of that 4%, when you consider the trillions and trillions of vehicle miles that are racked up every year in this country, if you could save a small portion of that, we're still talking about quite a large saving in fuel as well as travel time," he pointed out.

Powers added that lost drivers can be safety hazards because they tend to drive more erratically, making sudden maneuvers and driving faster than normal.

The experimental system used a computer to provide route information for 43 origins and destinations in the Washington area. The computer selected and played back appropriate parts of prerecorded instructions, depending on the route needed. The caller could enter additional codes through the telephone.

> *'In order to use the system, you have to know where you are and where you are going. If you have that much information, you can use a map.'*

Computer support was provided through facilities here of a minority contractor, Input-Output Computer Services, Inc. of Waltham, Mass.

While money has been set aside for continuing the project next year, the next step is not into the procurement stage yet, he said.

Asked if the Golden Fleece Award would affect the FHA plans, Powers replied: "I don't know. Our feeling here is that we have a good project, that it's a worthwhile activity, has potential for energy and safety savings, and I'm not sure that it's going to affect us very much."

Correction

The correct prices for Insac Software, Inc.'s Shadow II data communications monitor are $20,000 for the DOS version and $40,000 for the OS version. They were listed incorrectly in the Product Spotlight chart specifying characteristics for OS- and DOS-type monitors [CW, Dec. 15]. Correct prices for Task/Master II from Turnkey Systems, Inc. are $42,000 for the DOS version and $58,000 for OS. Prices listed in the copy accompanying the charts are correct.

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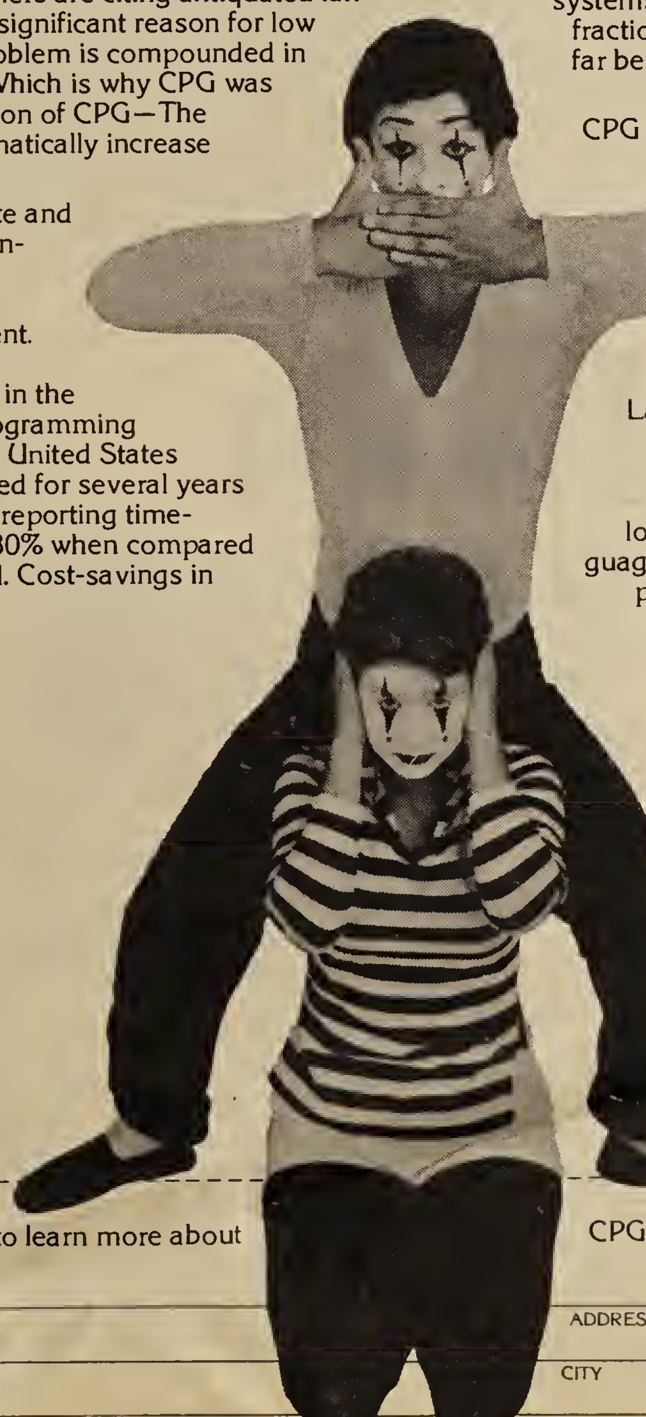

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Firm Converts OS to DOS in Six Months

(Continued from Page 1)

gram conversions were in an "opposite-to-normal" direction — from OS on the 370/158 to DOS/VSE on the 4331 Group 1 hardware. The "tremendous number of coding changes had to be done manually" because there weren't any packages available for converting OS Cobol programs to DOS format, Paste said.

However, the decision to go in that direction was based on an estimated cost savings of some 20% per month for the seven-year-old general insurance agency currently in the $45 million premium range.

Initial Reluctance

Paste admitted an initial reluctance to move from an OS to a DOS environment although it made sense from an economical standpoint. He thought the changeover might have a negative effect on the career paths of himself and his staff since DOS is generally regarded as less technically sophisticated than OS.

However, an informal look at the trend for companies comparable in size to NDS convinced him that "there will be a bigger demand than ever for programmers who are familiar with DOS/VSE." The 4300 series with DOS/VSE makes it feasible for more organizations in this range to install an in-house computer rather than using outside services, he said.

After attending several IBM-sponsored demonstrations and getting some exposure to its System Installation Productivity Option (Sipo), Paste and his technical group could see no reason why applications programmers couldn't handle the conversion — provided they had the necessary training and tools.

Everyone within the DP area took over a particular assignment for the conversion, according to Paste. Pope was responsible for ordering the hardware and setting up the physical site. This allowed Paste's group to concentrate on the system software considerations.

One of the programmer/analysts with three years of Cobol programming experience was assigned the task of handling all Vsam file considerations. The other programmer/analyst whose background was primarily confined to working with OS/JCL rather than applications programs performs the sysgens, installs software "fixes" as required and maintains CICS.

The two programmer/analysts went to the necessary IBM classes to fulfill their tasks and Paste attended all of the appropriate classes in order to function as a backup when required.

The programmer trainee with some six months of programming background coded the modifications to the 150 Cobol programs. Although the coding changes were extensive "so far, only two [programs] had to be recompiled because of coding errors," Paste said.

Education for the OS to DOS conversion began in May 1980 with Paste describing himself as "scared to death of DOS." Coming from an OS environment, I was concerned by the amount of operator intervention normally associated with the DOS operating systems."

He was also concerned about having to recompile programs if file allocations changed from disk to tape, he said. So, he followed the classic DP route of asking systems programmers and technicians he met at the classes for help and suggestions.

This technical grapevine pointed him towards five software products from Computer Associates, Inc. — products that he felt would make the lives of the OS-turned-DOS programmers easier.

CA-Dynam/T and CA-Dynam/D were installed to handle tape and disk file allocations and CA-Dynam/Fi allowed for switching between tape and disk without the need to rewrite application programs, he explained.

NDS had multiple Vsam files which require operator intervention when abends occur under DOS and used condition codes to control step execution in job streams. To avoid sacrificing the power and flexibility of OS JCL, CA/Driver was installed to minimize operator intervention and simplify JCL and job management, he said. The fifth product was the CA-Sort.

Stressing that none of the staff knew any assembly or machine-level language, Paste felt that the Computer Associates; software was especially helpful to the "nontechnical" applications-oriented staff at NDS.

After generating the Sipo software at the IBM support center and getting the 4331 installed, conversion took place over Labor Day weekend and the system went into production on Sept. 27.

Although originally scheduled for one month of full parallel testing with the 370/158, things went so smoothly under the new system that NDS went off the 158 on the originally estimated cutoff date of Oct. 15.

Upkeep Costs Predicted to Rise 22%/Year

(Continued from Page 1)

and hardware systems with integrated fail-soft capability, dynamic reconfiguration, automatic retry and checkpoint/restart type facilities, the study predicted.

Users should expect to see costs for software maintenance on a per-product basis increase, on the average, as much as hardware maintenance costs. However, the number of software maintenance items charged for during the next three to four years will increase by about 100% per year, the study estimated.

Besides largely personnel-related in-house maintenance expenses, users pay out-of-pocket expenses of nearly $3 billion for hardware and software maintenance, according to the research firm.

Behind the escalation of maintenance costs is IBM's move toward diminished local software support. The introduction of the 4300 in February 1979 set the maintenance philosophy IBM will pursue in coming years.

Prior to the introduction of the 4300, IBM had five main operating systems, the major portion of each classified as a System Control Program (SCP). There were generally no charges for the SCP products or their maintenance. On the other hand, program products (PP) have a monthly licensing fee which includes a component for maintenance.

With the introduction of the 4300, however, IBM reduced the scope of the SCP portion of the operating systems, reclassifying many parts of those systems as program products. While the monthly licensing fee generally includes maintenance, IBM earlier this year determined that for certain program products, visits by local program service representatives are chargeable either on a per-call basis or under maintenance contracts with monthly fees, the report observed.

Most of the SCP features that made DOS/VS workable, such as the ability to handle multiple partitions, were moved from the SCP category to the PP category with the introduction of DOS/VSE, essentially a new version of DOS/VS.

Support Centers

During the same time frame, IBM instituted its powerful support center concept. Under this arrangement, a user with a suspected software problem must first contact the support center which serves as a triage unit, dispatching a local program service representative only in a minority of cases.

IBM expects two-thirds of all complaints to be resolved in the initial phone call to the support center.

Continuing the trend toward shifting the responsibility for problem identification and resolution to the user, IBM extended its support center coverage to MVS/SP for Series 30 systems and the 3081 and set a maintenance contract in place for local program support. However, IBM will not charge for local support for these systems until January 1982.

However, for these large systems IBM also offers an Information Access facility, a new feature of the Information/Systems Release 2 program product. A tool to improve maintenance capability, the feature allows users to access an IBM data base of customer failure information.

As a result of the unbundling of maintenance, users will have to devote a higher percentage of their already pressed maintenance staffs to activities once supplied by IBM at no charge.

The comprehensive survey entitled "Strategic Analysis of Software and Hardware Maintenance" analyzes IBM's maintenance policies in depth as well as those for other vendors such as Amdahl Corp. and Hewlett-Packard Co. The report costs $1,500 and is available from Strategic Business Services at Suite 215, 4320 Stevens Creek Blvd., San Jose, Calif. 95129.

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Data Loss, Falsification Reported

Problems Traced to 90% of Poland's DP Centers

By Bohdan O. Szuprowicz
Special to CW

WARSAW, Poland — More than 90% of the DP centers within Poland's national DP service organization (Zeto) have experienced some loss or accidental falsification of the data during processing, according to an article in *Informatica*, a monthly technical magazine published here.

This was among the problems identified in a study conducted during 1980 by the Military Academy of Politics here.

The academy found that the frequency of such events varied from center to center, with some reporting as many as 100 such instances and others reporting only a few problems during the same period.

The Military Academy of Politics is under the jurisdiction of the Ministry of National Defense, suggesting that the Polish military establishment may also be a user of the Zeto DP network whose performance would thus impact national security.

System Problems

Almost two-thirds of all Zeto service centers — which operate almost exclusively Polish, Soviet and other Eastern European-built computers and peripherals — linked magnetic tape units used with the breakdowns in reliability.

However, 48% of all the centers also reported similar problems resulting from the use of card and paper-tape equipment, and 45% had problems associated with magnetic disk units.

Equipment failures resulting from environmental causes due to inadequate air conditioning systems were reported by more than 63% of the Zeto centers.

Among the causes of these breakdowns, 81% of the centers reported those to be technical in nature, but 82% also reported human error as an important factor. Poor quality of tapes and disks was considered to be the major cause of problems by 26% of the centers.

Damage of magnetic media during transportation and storage was reported as another cause of processing problems by 46% of the centers. Another 36% reported problems due to damage from fire, floods and power failures, and 8% indicated vulnerability to electromagnetic field effects.

Programming error as a cause of bad output was admitted to by only 19% of the centers. More interestingly, only 64% of the centers took the trouble to inform their end-user clients about the existence of such problems or the loss and destruction of data.

Zeto is under the jurisdiction of the Ministry of Science, Higher Education and Technology and operates at least 81 large computers installed at 47 different computing centers throughout Poland.

Most of the equipment consists of Polish-built Odra 1300 series using George-2 and George-3 operating systems of ICL origin and various Riad series computers, some of which are imported from the Soviet Union, East Germany, Hungary, Czechoslovakia and Bulgaria using OS operating systems reportedly similar to IBM software used with 360 and 370 CPUs.

At least half the computer installations within the Zeto inventory are large configurations with multiple tape and disk drives, but unit record and paper tape I/O devices are also used extensively. Only three installations within the network are operated on a time-sharing basis.

Zeto provides DP services to more than 1,000 end-user clients in banking, insurance, commerce, social security, manufacturing, construction, housing and agriculture.

It employs more than 6,000 workers and derives about 75% of its revenues from machine time sales, although systems analysis and programming services are also available.

Although the primary objective of Zeto is to service domestic end users in Poland that are too small to justify their own computers, the organization has also been in the export business since 1978.

It now promotes and provides its software services not only to other Comecon countries but also in West Germany, Great Britain, France, the Netherlands and "selected" countries of the Third World.

Productivity Topic of Meet

WASHINGTON, D.C. — "Improving Organizational Productivity Through Systems Technology" is the theme of the Executive Computer Conference to be held here April 13-14. The conference is being sponsored by Infosystems.

Trends in the use of computer technology in planning, personnel management and paperwork will be discussed, as well as the impact of small computer technology and managerial decision support systems.

Registration for the conference costs $400. More information can be obtained from Kendall Burroughs at the Executive Computer Conference, Suite 400, 1730 N. Lynn St., Arlington, Va. 22209.

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Rising Software Costs Found Offset by Other Savings

By Bruce Hoard
CW Staff

Software expenditures have gone up and will continue in that direction, according to the Datapro Research Corp.'s "User Ratings of Proprietary Software" report. However, increased expenditures are being counterbalanced by savings derived from package usage, the survey discovered.

Just over 86% indicated packages had saved them money. Also, most users achieved positive results through decreased spending in other areas — particularly, human resources (see related story). Only 17.3% claimed no dollar savings and 1.5% reported losses.

The expenditure growth rate from 1979 to 1980 was 21.6% and is expected to drop only slightly to 21.4% between this year and next.

More than 1,000 respondents supplied total dollar expenditure and average dollar expenditure for the three-year period. That information reflects total expenditures of $77,747,000, $112,895,000 and $108,892,000. In terms of average expenditure per user, the figures read $58,766, $71,452 and $86,773.

Table 1 portrays the approximate dollar amount spent, the number and percent of respondents and the relevant year of the expenditure.

Substantial expenditures were reported by the 24.9% of users who made software modifications. Almost 10% spent under $2,000, 8.1% spent between $2,000 and $10,000 and 5.5% expended over $10,000.

The majority (71.4%) of users said they required no modifications, while 13.6% reported modifications paid for by vendors.

	1979	1980	1981
No expenditure	9.6% (205)	6.0% (129)	5.2% (111)
Under $2,000	5.9% (127)	6.5% (139)	3.3% (70)
$2,000-3,999	6.6% (141)	7.1% (152)	5.0% (108)
$4,000-5,999	5.7% (122)	5.8% (125)	5.0% (106)
$6,000-8,999	4.5% (96)	5.0% (107)	2.7% (58)
$9,000-11,999	4.1% (87)	5.1% (110)	4.5% (97)
$12,000-15,999	4.8% (102)	5.5% (117)	3.7% (79)
$16,000-19,999	1.6% (34)	1.9% (41)	1.2% (25)
$20,000-29,999	6.5% (140)	7.1% (152)	7.6% (163)
$30,000-39,999	3.6% (77)	4.9% (105)	4.2% (90)
$40,000-49,999	2.0% (42)	3.3% (71)	2.6% (55)
$50,000-69,999	3.7% (80)	3.9% (83)	3.6% (76)
$70-000-99,999	3.4% (72)	4.2% (89)	3.5% (75)
$100,000-199,999	4.3% (91)	6.4% (138)	6.4% (136)
$200,000-499,999	2.4% (52)	3.1% (67)	3.8% (81)
$500,000 or more	1.3% (28)	1.8% (39)	1.6% (35)
No answer	30.1% (644)	22.2% (476)	36.2% (775)

Table 1

Chart Courtesy of Datapro

Datapro's Methods Based On Analyses by Clusters

The Datapro "User Ratings of Proprietary Software" report employed "cluster methodology" in an effort to classify its results.

Survey designers decided to establish four categories, or clusters, in which to report results.

They could have chosen any number but decided on four. Looking at it in academic grading terms, Cluster 1 represents an "A," Cluster 2 a "B" and so on.

In the case of reliability (see Table 2), the top range of answers (Cluster 1) ran from a low of 3.28 to a theoretical high of 4.

Integrity of Ratings

With four clusters, or categories, to choose from and based on the entire range of replies, it was decided that to include any score below 3.28 would impugn the integrity of those highest, and most favorable, ratings.

Separate cluster analyses were made for all 289 packages *fully* rated by three or more respondents.

Although 301 packages were evaluated by three or more users, key questions were not answered on some questionnaires, leading to disqualification of 12.

	Reliability	Troubleshooting	Efficiency	Documentation	Ease of Installation	User Education	Ease of Use	Vendor Maintenance	Overall Satisfaction
Cluster 1	3.28 - 4.00	3.20 - 4.00	3.45 - 4.00	3.15 - 4.00	3.42 - 4.00	3.33 - 4.00	3.24 - 4.00	3.60 - 4.00	3.50 - 4.00
Cluster 2	2.66 - 3.27	2.53 - 3.19	2.66 - 3.44	2.57 - 3.14	2.88 - 3.41	2.85 - 3.32	2.71 - 3.23	3.00 - 3.59	2.75 - 3.49
Cluster 3	2.16 - 2.65	2.00 - 2.52	2.00 - 2.65	2.14 - 2.56	2.00 - 2.87	2.16 - 2.84	2.33 - 2.70	2.00 - 2.99	2.00 - 2.74
Cluster 4	below 2.16	below 2.00	below 2.00	below 2.14	below 2.00	below 2.16	below 2.33	below 2.00	below 2.00

Chart Courtesy of Datapro

Table 2

Two-Page Questionnaire

The Datapro "User Ratings of Proprietary Software" survey was sent to 5,000 names from the *Computerworld* circulation list late last summer and consisted of a two-page questionnaire.

Recipients were broken down by title, occupation or function and business and industry classification. Typical titles included director of operations planning, director of DP, systems manager and manager of programming.

Business and industry classifications included wholesale and retail trade, financial institutions, insurance companies and real estate firms, non-DP business services and government.

The return rate was 60.9%: A total of 3,033 surveys were received. As could be expected, not all questionnaires were completely filled out. The survey results are based on those questionnaires in which at least one software package was evaluated. A package evaluation was not done unless the package received at least three ratings. The number of respondents rating one package was 1,055; 496 rated two and 589 rated three or more. In order to be eligible for evaluation, software packages must have been either tested or used extensively within the past year.

The mean average rating of each package was established on a scale of one to four, with four meaning excellent and one, poor.

Users Say Software Performs as Promised

(Continued from Page1)

system from Goal Systems Corp; IBM's System Support Programming (SSP), the operating system for the System/34; FMS-11, a multikey Isam file management structure from NCA Corp.; and Com-plete, a teleprocessing system from Software AG of North America, Inc.

An overwhelming 81.9% of users said they use software priced separately from computer vendors, while 26.4% indicated an exclusive reliance on vendor packages. An additional 13.8% said they use only independently supplied software and 58.5% rely on both computer and independent vendors.

DP managers play an integral role in software evaluation and acquisition, according to the survey. On the evaluation side, 90.3% said they participate, while a slightly lesser 80.9% said the DP manager is responsible for approving acquisitions.

See charts covering Datapro's "User Ratings of Proprietary Software" on Pages 11-20.

Total expenditures for software packages rose substantially from 1979 to 1980, the survey noted, adding that trend is expected to continue throughout 1981 (see story on Page 10).

Slightly less than one-third (30.9%) of all packages rated had been used or tested prior to 1978, an even 20% were used/tested in 1978, 30.4% were used/tested during 1979 and 31.2% were used/tested this year.

The survey also attempted to probe the users' "share of mind," or the software package that comes first to mind; "share of market," the package used most in the past year; and "share of future market," the package most likely to be bought next.

"Unsure" and data management topped the bill in all three categories, with the former rating first under share of future market and the latter occupying the top slot in the other two categories. Among the runners-up, system utilities, accounting, manufacturing and data communications all posted strong showings.

Asked to identify their mode of software acquisition, users indicated 65.3% of packages were acquired under permanent lease, 18.3% by long-term lease and 29.1% via short-term lease.

Cluster Methodology

A total of 301 packages supplied by 124 vendors were evaluated three or more times and rated through the use of cluster methodology (see related story). The following criteria were considered on a one-to-four-point scale, with four being excellent and one regarded as poor:

- Reliability.
- Efficiency.
- Ease of installation.
- Ease of use.
- Vendor's technical support (trouble-shooting, documentation and user education).
- Vendor's maintenance.
- Overall satisfaction.

Flee/Flim, SSP, FMS-11 and Complete were the only four packages rated in the top cluster for all nine criteria. However, 38 packages broke into the top cluster for overall satisfaction and were rated at least second in the other eight categories.

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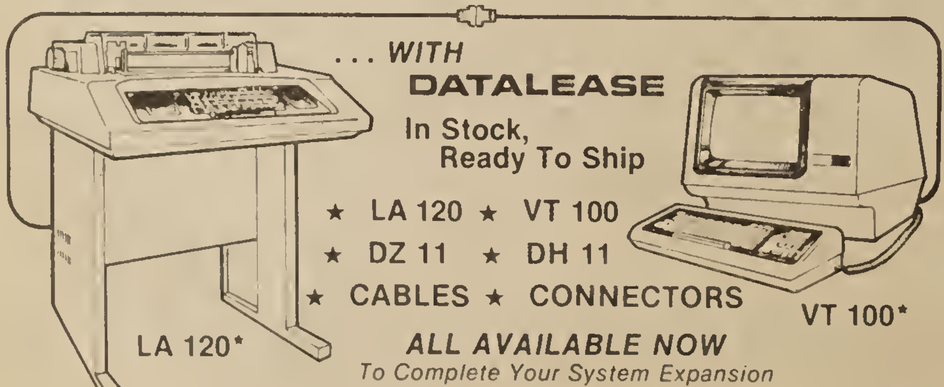

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Users Rate Their Software

PROPRIETARY SOFTWARE: USER RATINGS AND CLUSTER ANALYSIS

Vendor and Package Name	No. of User Ratings Received	Mean Average User Ratings								
		Reliability	Efficiency	Ease of Installation	Ease of Use	Vendor's Technical Support			Vendor's Maintenance	Overall Satisfaction
						Trouble Shooting	Documentation	User Education		
Admins, Inc.										
ADMINS-11	5	3.4	3.8	3.8	4.0	3.0	2.8	3.0	3.0	3.4
Allen Services, Inc.										
MSI	6	3.7	3.5	3.5	3.5	3.3	3.0	2.8	3.5	3.2
Altergo (now Insac Software)										
SHADOW II	10	3.6	3.7	3.7	3.6	3.1	3.1	2.9	3.0	3.5
SYSTEM/MANAGER	7	3.6	3.6	3.7	3.7	3.2	2.7	2.4	3.2	3.5
American Appraisal Assoc.										
Fixed Assets	3	3.7	3.0	4.0	2.7	3.0	3.0	3.3	3.0	3.3
Application Software, Inc.										
ASI-ST	6	3.6	3.4	3.6	3.0	2.2	3.0	2.4	2.8	3.0
Applied Data Research, Inc.										
DATACOM/DB	7	3.7	3.9	2.9	3.6	3.5	2.9	3.4	3.2	3.7
LIBRARIAN	42	3.6	3.4	3.5	3.5	3.2	3.2	3.0	3.2	3.4
LOOK	4	3.8	3.8	3.8	3.8	3.5	3.5	3.3	3.3	3.8
ROSCOE	27	3.7	3.5	3.2	3.5	3.0	3.1	3.1	3.3	3.4
VOLLIE	20	3.8	3.8	3.6	3.9	3.6	3.6	3.2	3.6	3.8
Arista Mfg. Systems										
ARISTA	3	3.3	2.7	3.3	3.0	3.5	3.0	3.0	3.5	3.5
Arthur Andersen & Co.										
Accounts Payable	3	3.0	2.3	2.0	2.3	1.7	2.7	2.3	1.7	2.3
General Ledger	3	2.7	2.7	2.7	3.0	2.3	3.0	2.0	2.3	2.7
MAC-PAC	3	3.0	1.3	2.3	2.3	2.0	2.7	3.0	1.7	2.0
ASK Computer Services										
FINMAN	4	4.0	3.3	4.0	4.0	2.7	2.0	2.0	3.0	3.7
MANMAN	6	3.5	2.3	3.3	3.3	3.0	2.0	2.3	2.8	2.8
Atlantic Software, Inc.										
PC/70	7	2.9	2.0	2.7	2.6	2.4	2.6	2.9	2.6	2.6
Bancroft Computer Systems										
General Ledger	3	3.3	3.0	2.7	3.0	2.7	3.0	2.3	3.3	2.7
Boole & Babbage										
RESOLVE	3	3.3	3.7	3.0	3.0	2.3	2.7	2.5	2.3	3.0
Burroughs Corp.										
Accounts Payable	4	3.0	3.0	3.0	2.5	2.0	2.5	1.8	2.0	2.8
Audit Reporter	5	3.4	2.4	3.4	2.8	2.2	1.8	2.8	2.4	2.8
BHAS II	8	2.9	2.3	2.3	2.8	2.4	1.9	1.9	2.0	2.5
CANDE	10	3.8	3.6	3.7	3.6	3.3	2.9	2.6	3.1	3.5
CBMS II	6	2.8	2.5	2.7	3.2	2.0	2.8	2.2	2.3	2.3
COBOL	5	3.6	2.8	3.6	3.4	2.4	2.4	2.0	2.2	3.0
DMS II	28	3.3	2.9	3.1	3.1	2.5	2.3	2.5	2.6	3.0
FORTE II	6	3.6	2.6	3.0	3.2	2.8	3.0	2.4	2.8	3.0
General Ledger	3	3.3	3.3	3.0	3.0	1.7	3.0	1.7	2.0	2.7

LEGEND. Mean average user ratings for each package, as tabulated above, were calculated on a scale of 4 for each user rating of Excellent, 3 for Good, 2 for Fair, and 1 for Poor

Separate cluster analyses were then made of the mean average user ratings for all packages rated by three or more respondents These cluster analyses were used to determine the ranges of mean average user ratings which can be interpreted as being in the highest cluster, the second, the third, and the fourth or lowest cluster for each characteristic The mean averages which fall into each cluster group for each characteristic are listed at the bottom of the facing page The resulting hierarchical cluster groupings for each package are tabulated on the facing page

REPRODUCED WITH PERMISSION

Vendor and Package Name	No. of User Ratings Received	Hierachical Cluster Groupings								
		Reliability	Efficiency	Ease of Installation	Ease of Use	Vendor's Technical Support			Vendor's Maintenance	Overall Satisfaction
						Trouble Shooting	Documentation	User Education		
Admins, Inc.										
ADMINS-11	5	1	1	1	1	2	2	2	2	2
Allen Services, Inc.										
MSI	6	1	1	1	1	1	2	3	2	2
Altergo (now Insac Software)										
SHADOW II	10	1	1	1	1	2	2	2	2	1
SYSTEM/MANAGER	7	1	1	1	1	2	2	3	2	1
American Appraisal Assoc.										
Fixed Assets	3	1	2	1	3	2	2	1	2	2
Application Software, Inc.										
ASI-ST	6	1	2	1	2	3	2	3	3	2
Applied Data Research, Inc.										
DATACOM/DB	7	1	1	3	1	1	2	1	2	1
LIBRARIAN	42	1	2	1	1	1	1	2	2	2
LOOK	4	1	1	1	1	1	1	2	2	1
ROSCOE	27	1	1	2	1	2	2	2	2	2
VOLLIE	20	1	1	1	1	1	1	2	1	1
Arista Mfg. Systems										
ARISTA	3	1	2	2	2	1	2	2	2	1
Arthur Andersen & Co.										
Accounts Payable	3	2	3	3	3	4	2	3	4	3
General Ledger	3	2	2	3	2	3	2	4	3	3
MAC-PAC	3	2	4	3	3	3	2	2	4	3
ASK Computer Services										
FINMAN	4	1	2	1	1	2	4	4	2	1
MANMAN	6	1	3	2	1	2	4	3	3	2
Atlantic Software, Inc.										
PC/70	7	2	3	3	3	3	2	2	3	3
Bancroft Computer Systems										
General Ledger	3	1	2	3	2	2	2	3	2	3
Boole & Babbage										
RESOLVE	3	1	1	2	2	3	2	3	3	2
Burroughs Corp.										
Accounts Payable	4	2	2	2	3	3	3	4	3	2
Audit Reporter	5	1	3	2	2	3	4	3	3	2
BHAS II	8	2	3	3	2	3	4	4	3	3
CANDE	10	1	1	1	1	1	2	3	2	1
CBMS II	6	2	3	3	2	3	2	3	3	3
COBOL	5	1	2	1	1	3	3	4	3	2
DMS II	28	1	2	2	2	3	3	3	3	2
FORTE II	6	1	3	2	2	2	2	3	3	2
General Ledger	3	1	2	2	2	4	2	4	3	3
NOTE: The range of average user ratings attributed to each cluster for each characteristic is as follows:										
Cluster 1		3.28 to 4.00	3.45 to 4.00	3.42 to 4.00	3.24 to 4.00	3.20 to 4.00	3.15 to 4.00	3.33 to 4.00	3.60 to 4.00	3.50 to 4.00
Cluster 2		2.66 to 3.27	2.66 to 3.44	2.88 to 3.41	2.71 to 3.23	2.53 to 3.19	2.57 to 3.14	2.85 to 3.32	3.00 to 3.59	2.75 to 3.49
Cluster 3		2.16 to 2.65	2.00 to 2.65	2.00 to 2.87	2.33 to 2.70	2.00 to 2.52	2.14 to 2.56	2.16 to 2.84	2.00 to 2.99	2.00 to 2.74
Cluster 4		Below 2.16	Below 2.00	Below 2.00	Below 2.33	Below 2.00	Below 2.14	Below 2.16	Below 2.00	Below 2.00

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Users Rate Their Software . . .

PROPRIETARY SOFTWARE: USER RATINGS AND CLUSTER ANALYSIS

Vendor and Package Name	No. of User Ratings Received	Mean Average User Ratings								
		Reliability	Efficiency	Ease of Installation	Ease of Use	Vendor's Technical Support			Vendor's Maintenance	Overall Satisfaction
						Trouble Shooting	Documentation	User Education		
Burroughs Corp (Continued)										
GEMCOS	5	3.4	3.0	3.5	3.2	2.6	2.4	3.0	2.4	3.0
MCP	5	3.6	3.6	3.6	3.8	2.8	3.0	2.8	3.4	3.4
NDL	9	3.7	3.2	3.2	3.6	2.0	2.6	2.4	2.1	3.1
ODESY	6	3.3	2.7	3.0	3.5	2.6	2.7	2.0	2.7	2.5
Payroll	4	2.5	3.3	2.5	3.5	1.3	2.3	1.3	2.0	1.8
PCS II	7	3.1	3.3	3.1	3.0	2.9	2.6	3.0	3.1	3.1
Text Editor	7	3.9	3.4	3.6	3.4	2.6	2.7	2.3	3.0	3.4
THRIFT	4	3.3	3.3	3.0	3.0	2.5	2.8	2.3	2.8	3.0
Business EDP										
PRO	4	3.5	3.3	3.5	4.0	3.0	3.3	3.5	3.5	3.5
Cambridge Systems Group										
ACF2	7	3.9	3.1	2.5	2.7	3.4	2.9	2.9	3.3	3.1
ASM2	4	3.3	3.0	2.3	2.5	2.8	1.8	2.5	2.8	3.0
Candle Corp										
OMEGAMON	5	3.8	3.4	3.6	3.6	3.7	3.2	3.3	3.5	3.8
Capex Corp										
MANAGE/IMS	3	3.0	3.0	3.3	3.0	2.3	2.7	2.3	2.3	2.3
OPTIMIZER III	12	3.7	3.3	3.5	3.4	3.3	3.2	3.0	3.5	3.6
TLMS	3	3.7	3.3	3.0	3.3	2.7	3.0	2.5	3.0	3.3
Century Analysis										
BOSS/3	11	3.6	3.5	3.5	3.5	3.5	3.2	3.5	3.5	3.7
Cincom Systems										
ENVIRON/1	7	3.0	2.7	1.7	2.3	2.3	2.1	2.3	2.7	2.3
TOTAL	45	3.5	3.1	3.2	3.2	2.9	2.8	3.0	3.0	3.1
Computer Associates										
CA-SORT	38	3.9	3.9	3.8	3.9	3.4	3.3	3.2	3.5	3.7
DYNAM/D	14	3.7	3.3	3.3	3.6	3.2	3.3	2.9	3.5	3.5
DYNAM/FI	5	3.4	3.6	3.6	3.6	2.6	2.8	2.4	3.0	3.2
DYNAM/T	29	3.7	3.5	3.7	3.8	3.4	3.1	2.9	3.4	3.6
JASPER+	9	3.4	3.1	2.9	2.8	2.6	2.8	1.9	2.3	3.0
Comserv Corp										
AMAPS	4	3.8	3.3	2.8	3.0	3.3	3.5	3.3	3.0	3.0
The Continuum Co										
LIFE/70	3	3.7	3.0	2.3	2.7	2.7	3.3	3.0	3.3	2.7
Cullinane Corp										
CULPRIT	10	3.4	3.1	3.4	3.2	3.1	2.6	2.8	3.0	3.2
EDP AUDITOR	4	3.3	3.3	2.8	3.0	2.8	2.8	3.0	2.8	3.0
IDD	3	3.0	2.7	3.3	2.3	2.3	2.0	2.7	2.7	2.7
IDMS	35	3.3	3.1	2.9	3.1	3.0	2.8	3.2	3.0	3.2
INTERACT	3	3.3	3.3	3.3	3.3	3.3	3.3	2.3	2.5	3.0
Cyborg Systems										
Payroll	3	3.0	2.5	2.5	2.5	3.0	2.0	3.0	3.0	3.0

LEGEND Mean average user ratings for each package, as tabulated above, were calculated on a scale of 4 for each user rating of Excellent, 3 for Good, 2 for Fair, and 1 for Poor

Separate cluster analyses were then made of the mean average user ratings for all packages rated by three or more respondents These cluster analyses were used to determine the ranges of mean average user ratings which can be interpreted as being in the highest cluster the second, the third, and the fourth or lowest cluster for each characteristic The mean averages which fall into each cluster group for each characteristic are listed at the bottom of the facing page The resulting hierarchical cluster groupings for each package are tabulated on the facing page

REPRODUCED WITH PERMISSION

Vendor and Package Name	No. of User Ratings Received	Hierachical Cluster Groupings								
		Reliability	Efficiency	Ease of Installation	Ease of Use	Vendor's Technical Support			Vendor's Maintenance	Overall Satisfaction
						Trouble Shooting	Documentation	User Education		
Burroughs Corp (Continued)										
GEMCOS	5	1	2	1	2	2	3	2	3	2
MCP	5	1	1	1	1	2	2	3	2	2
NDL	9	1	2	2	1	3	3	3	3	2
ODESY	6	1	2	2	1	2	2	4	3	3
Payroll	4	3	2	3	1	4	3	4	3	4
PCS II	7	2	2	2	2	2	2	2	2	2
Text Editor	7	1	2	1	1	2	2	3	2	2
THRIFT	4	2	2	2	2	3	2	3	3	2
Business EDP										
PRO	4	1	2	1	1	2	1	1	2	1
Cambridge Systems Group										
ACF2	7	1	2	3	2	1	2	2	2	2
ASM2	4	2	2	3	3	2	4	3	3	2
Candle Corp.										
OMEGAMON	5	1	2	1	1	1	1	1	2	1
Capex Corp.										
MANAGE/IMS	3	2	2	2	2	3	2	3	3	3
OPTIMIZER III	12	1	2	1	1	1	1	2	2	1
TLMS	3	1	2	2	1	2	2	3	2	2
Century Analysis										
BOSS/3	11	1	1	1	1	1	1	1	2	1
Cincom Systems										
ENVIRON/1	7	2	2	4	4	3	3	3	3	3
TOTAL	45	1	2	2	1	2	2	2	3	2
Computer Associates										
CA-SORT	38	1	1	1	1	1	1	2	2	1
DYNAM/D	14	1	2	2	1	1	1	2	2	1
DYNAM/FI	5	1	1	1	1	2	2	3	2	2
DYNAM/T	29	1	1	1	1	1	2	2	2	1
JASPER+	9	1	2	2	2	2	2	4	3	2
Comserv Corp.										
AMAPS	4	1	2	3	2	1	1	2	2	2
The Continuum Co.										
LIFE/70	3	1	2	3	3	2	1	2	2	3
Cullinane Corp.										
CULPRIT	10	1	2	2	2	2	2	3	2	2
EDP AUDITOR	4	2	2	3	2	2	2	2	3	2
IDD	3	2	2	2	3	3	4	3	3	3
IDMS	35	1	2	2	2	2	2	2	2	2
INTERACT	3	1	2	2	1	1	1	3	3	2
Cyborg Systems										
Payroll	3	2	3	3	3	2	4	2	2	2
NOTE: The range of average user ratings attributed to each cluster for each characteristic is as follows:										
Cluster 1		3.28 to 4.00	3.45 to 4.00	3.42 to 4.00	3.24 to 4.00	3.20 to 4.00	3.15 to 4.00	3.33 to 4.00	3.60 to 4.00	3.50 to 4.00
Cluster 2		2.66 to 3.27	2.66 to 3.44	2.88 to 3.41	2.71 to 3.23	2.53 to 3.19	2.57 to 3.14	2.85 to 3.32	3.00 to 3.59	2.75 to 3.49
Cluster 3		2.16 to 2.65	2.00 to 2.65	2.00 to 2.87	2.33 to 2.70	2.00 to 2.52	2.14 to 2.56	2.16 to 2.84	2.00 to 2.99	2.00 to 2.74
Cluster 4		Below 2.16	Below 2.00	Below 2.00	Below 2.33	Below 2.00	Below 2.14	Below 2.16	Below 2.00	Below 2.00

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. . . In a Variety of Categories

PROPRIETARY SOFTWARE: USER RATINGS AND CLUSTER ANALYSIS

Vendor and Package Name	No. of User Ratings Received	Mean Average User Ratings								
		Reliability	Efficiency	Ease of Installation	Ease of Use	Vendor's Technical Support: Trouble Shooting	Vendor's Technical Support: Documentation	Vendor's Technical Support: User Education	Vendor's Maintenance	Overall Satisfaction
Data Design Assoc.										
Fixed Assets	7	3.6	3.0	3.1	3.0	3.3	3.4	3.0	2.4	3.1
Data General Corp.										
AOS	4	3.3	3.0	3.8	3.5	2.3	2.0	2.7	2.3	3.0
Data Processing Design										
WORD-11	4	3.8	3.0	2.8	3.3	2.8	3.0	3.0	3.0	3.5
Data Systems for Industry										
Acct. Sys.	3	3.3	2.0	3.3	2.7	2.7	2.3	2.3	2.7	3.0
Digital Equipment Corp.										
BASIC-PLUS-TWO	3	4.0	3.7	3.3	3.3	2.7	3.0	3.5	3.0	3.3
COBOL	3	3.5	2.5	3.0	3.5	2.7	2.5	3.0	3.0	3.0
DATATRIEVE	11	3.5	3.0	3.8	3.3	2.3	2.5	2.2	2.7	3.0
DBMS-10	3	3.3	2.7	2.7	2.7	1.7	2.7	2.7	2.0	2.7
FORTRAN	8	3.6	3.5	3.4	3.6	2.7	3.0	3.0	2.8	3.3
RMS 11	5	3.8	3.4	3.2	3.0	3.2	3.2	3.0	3.2	3.2
RSTS/E	6	3.8	3.3	3.2	3.5	2.0	2.8	2.3	2.7	3.2
RSX-11M	12	3.4	3.0	3.1	3.0	2.7	3.2	3.1	3.3	3.3
RT-11	5	4.0	4.0	3.8	3.4	3.8	3.4	3.4	3.4	3.6
WISE	3	2.7	1.3	3.0	2.3	1.5	1.5	2.0	1.5	2.3
Digital Research										
CP/M	9	3.3	3.0	2.9	3.0	2.3	2.3	1.9	2.7	3.1
DNA Systems										
TSO	5	3.6	3.0	3.6	3.4	3.4	3.0	2.6	3.4	3.2
Dylakor Software Systems										
DYL-250	5	3.8	3.4	3.6	3.2	3.3	3.2	4.0	3.5	3.6
DYL-260	22	3.7	3.5	3.5	3.1	3.2	3.0	2.8	3.1	3.4
ETDS										
General Ledger	3	3.7	3.3	3.3	3.3	3.0	3.0	2.7	3.0	3.3
Evans/Griffiths/Hart										
KDSS	3	3.7	3.3	3.3	3.3	3.7	3.0	2.0	3.3	3.7
Execucom Systems										
IFPS	3	3.7	2.3	2.7	3.7	3.0	3.0	3.3	3.0	3.3
Florida Software										
Certificates of Deposit	7	2.9	2.3	1.6	3.0	1.9	2.3	2.0	1.7	2.0
DDA Savings	3	2.3	1.7	2.3	2.7	1.7	2.0	1.7	1.7	2.0
Fortex Data Corp.										
Accounts Receivable	3	2.7	2.3	3.0	2.7	2.3	2.7	2.3	3.0	2.7
C-ARMS	3	3.0	2.7	2.5	3.3	2.0	2.7	2.3	2.3	3.0
Four-Phase Systems										
DATA IV	4	3.0	3.5	4.0	3.8	3.0	2.3	2.5	2.8	3.3

LEGEND: Mean average user ratings for each package, as tabulated above, were calculated on a scale of 4 for each user rating of Excellent, 3 for Good, 2 for Fair, and 1 for Poor.

Separate cluster analyses were then made of the mean average user ratings for all packages rated by three or more respondents. These cluster analyses were used to determine the ranges of mean average user ratings which can be interpreted as being in the highest cluster, the second, the third, and the fourth or lowest cluster for each characteristic. The mean averages which fall into each cluster group for each characteristic are listed at the bottom of the facing page. The resulting hierarchical cluster groupings for each package are tabulated on the facing page.

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Vendor and Package Name	No. of User Ratings Received	Hierachical Cluster Groupings								
		Reliability	Efficiency	Ease of Installation	Ease of Use	Vendor's Technical Support: Trouble Shooting	Vendor's Technical Support: Documentation	Vendor's Technical Support: User Education	Vendor's Maintenance	Overall Satisfaction
Data Design Assoc.										
Fixed Assets	7	1	2	2	2	1	1	2	3	2
Data General Corp.										
AOS	4	2	2	1	1	3	4	3	3	2
Data Processing Design										
WORD-11	4	1	2	3	1	2	2	2	2	1
Data Systems for Industry										
Acct. Sys.	3	1	3	2	3	2	3	3	3	2
Digital Equipment Corp.										
BASIC-PLUS-TWO	3	1	1	2	1	2	2	1	2	2
COBOL	3	1	3	2	1	2	3	2	2	2
DATATRIEVE	11	1	2	1	1	3	3	3	3	2
DBMS-10	3	1	2	3	3	4	2	3	3	3
FORTRAN	8	1	1	2	1	2	2	2	3	2
RMS 11	5	1	2	2	2	1	1	2	2	2
RSTS/E	6	1	2	2	1	3	2	3	3	2
RSX-11M	12	1	2	2	2	2	1	2	2	2
RT-11	5	1	1	1	1	1	1	1	2	1
WISE	3	2	4	2	3	4	4	4	4	3
Digital Research										
CP/M	9	1	2	2	2	3	3	4	3	2
DNA Systems										
TSO	5	1	2	1	1	1	2	3	2	2
Dylakor Software Systems										
DYL-250	5	1	2	1	2	1	1	1	2	1
DYL-260	22	1	1	1	2	2	2	3	2	2
ETDS										
General Ledger	3	1	2	2	1	2	2	3	2	2
Evans/Griffiths/Hart										
KDSS	3	1	2	2	1	1	2	4	2	1
Execucom Systems										
IFPS	3	1	3	3	1	2	2	1	2	2
Florida Software										
Certificates of Deposit	7	2	3	4	2	4	3	4	4	3
DDA Savings	3	3	4	3	3	4	4	4	4	3
Fortex Data Corp.										
Accounts Receivable	3	2	3	2	3	3	2	3	2	3
C-ARMS	3	2	2	3	1	3	2	3	3	2
Four-Phase Systems										
DATA IV	4	2	1	1	1	2	3	3	3	2
NOTE: The range of average user ratings attributed to each cluster for each characteristic is as follows:										
Cluster 1		3 28 to 4 00	3 45 to 4 00	3 42 to 4 00	3 24 to 4 00	3 20 to 4 00	3 15 to 4 00	3 33 to 4 00	3 60 to 4 00	3 50 to 4 00
Cluster 2		2 66 to 3 27	2 66 to 3 44	2 88 to 3 41	2 71 to 3 23	2 53 to 3 19	2 57 to 3 14	2 85 to 3 32	3 00 to 3 59	2 75 to 3 49
Cluster 3		2 16 to 2 65	2 00 to 2 65	2 00 to 2 87	2 33 to 2 70	2 00 to 2 52	2 14 to 2 56	2 16 to 2 84	2 00 to 2 99	2 00 to 2 74
Cluster 4		Below 2 16	Below 2 00	Below 2 00	Below 2 33	Below 2 00	Below 2 14	Below 2 16	Below 2 00	Below 2 00

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Users Rate Their Software . . .

PROPRIETARY SOFTWARE: USER RATINGS AND CLUSTER ANALYSIS

Vendor and Package Name	No. of User Ratings Received	Mean Average User Ratings								
		Reliability	Efficiency	Ease of Installation	Ease of Use	Vendor's Technical Support			Vendor's Maintenance	Overall Satisfaction
						Trouble Shooting	Documentation	User Education		
Gejac, Inc										
ARSAP	3	3.0	3.0	3.0	2.7	2.3	2.3	1.7	2.0	2.3
Goal Systems										
FLEE/FLIM	14	3.9	3.8	3.4	3.9	3.5	3.5	3.4	3.6	3.6
Henco, Inc										
INFO	3	3.7	2.7	3.3	3.7	3.3	2.3	2.7	3.5	3.3
Hewlett-Packard Co										
IMAGE/1000	3	3.7	2.7	3.3	3.0	3.5	3.7	3.7	3.0	3.0
IMAGE/3000	18	4.0	3.6	3.7	3.7	3.3	3.4	3.2	3.5	3.7
KSAM/3000	3	2.7	2.7	3.3	2.7	2.3	2.7	2.3	3.3	2.3
MFG/3000	6	3.2	2.8	3.8	3.2	2.8	2.8	2.8	3.3	3.2
MPE	3	3.3	3.3	3.7	3.7	2.7	3.0	3.0	3.0	3.0
QUERY	3	3.7	3.3	3.3	3.7	3.3	3.7	3.3	3.3	3.0
VIEW/3000	6	3.5	3.0	3.5	3.5	3.0	3.0	2.6	3.3	3.3
Honeywell Information Systems										
DM-IV	6	3.3	3.2	3.0	3.0	2.7	2.5	2.7	2.8	3.0
GCOS	9	3.4	3.2	2.8	3.1	2.4	2.3	2.6	2.6	2.8
IDS	7	2.9	2.9	2.3	2.4	2.6	2.4	2.3	2.4	2.7
IMS	8	3.6	3.3	3.1	3.0	3.5	2.6	2.6	3.1	2.9
TDS	10	3.3	3.2	2.8	3.1	2.4	2.7	2.6	2.4	2.9
TPS	3	3.0	2.7	1.7	2.3	2.3	1.7	2.3	2.5	2.0
IBM Corp.										
Accounts Payable (S/3)	4	3.0	2.5	2.5	3.0	1.7	3.0	2.5	1.5	2.8
Accounts Payable (S/34)	5	3.2	3.0	3.2	3.0	2.8	3.4	2.8	3.4	3.2
Accounts Receivable (S/3)	4	3.3	2.8	3.3	2.8	2.0	2.0	2.0	2.0	3.0
Accounts Receivable (S/34)	4	2.8	2.8	2.8	2.8	2.0	2.8	2.5	2.3	2.8
ACF/VTAM	6	3.3	3.2	2.2	2.8	2.3	3.0	2.7	2.8	3.0
ADF	5	3.0	2.4	2.6	3.2	2.8	2.6	2.5	2.0	2.8
Alpha Search	3	4.0	3.3	3.0	3.3	3.3	2.7	2.5	2.7	3.0
ATMS	3	3.0	2.3	2.7	3.0	2.3	2.3	2.7	3.0	3.0
BOMP (S/3)	12	3.3	2.8	2.4	2.8	2.4	2.8	2.3	2.5	2.8
CICS	103	3.2	2.6	2.4	2.7	2.8	2.7	2.7	2.8	2.9
CMAS (S/3/32/34)	9	3.1	2.2	2.2	2.4	2.9	2.4	2.3	2.9	2.4
COBOL (360/370)	10	3.5	3.0	2.9	3.1	2.7	3.0	2.7	2.7	3.0
COBOL (S/34)	3	3.3	3.3	4.0	3.7	2.3	2.3	2.3	2.3	3.3
COPICS	15	2.8	2.3	2.4	2.6	2.3	1.9	2.2	2.4	2.5
Database Tech (S/3)	7	3.4	3.3	2.9	3.3	3.0	3.4	2.7	3.0	3.0
Database Tech (S/34)	3	3.3	3.3	3.3	3.3	3.0	3.3	3.0	3.0	3.3
Data Dictionary	4	3.3	2.0	2.5	2.8	2.8	2.8	3.3	3.0	3.0
DBOMP	3	2.3	2.3	2.0	2.3	1.7	1.7	1.3	1.7	2.0
DFAS II (S/34)	5	3.4	3.2	3.2	3.2	2.8	2.6	2.8	3.0	3.0
DFAS (S/32)	4	3.5	2.5	2.5	3.5	2.0	3.3	2.8	2.3	3.0
DITTO	3	3.5	3.0	3.0	3.0	2.0	2.0	3.0	3.0	3.0
DMAS II	6	2.2	2.3	2.3	2.2	2.0	2.2	2.3	2.2	2.2
DMS	14	2.8	2.3	2.7	2.6	1.9	2.0	2.3	2.3	2.1
DOS/VS	4	3.0	3.0	2.5	3.3	3.5	3.0	2.8	3.0	2.8
DOS/VS DL/1	12	3.2	2.4	2.6	2.9	2.3	2.4	2.6	2.8	2.8
DOS/VSE	3	3.0	3.0	2.3	3.0	2.7	2.7	2.5	3.0	3.0
EDX	6	3.0	2.8	3.3	3.0	2.8	3.0	1.8	2.8	3.0
EPIC SOCRATES	3	3.3	2.7	2.3	2.7	2.3	2.7	2.0	2.3	2.7

LEGEND: Mean average user ratings for each package, as tabulated above, were calculated on a scale of 4 for each user rating of Excellent, 3 for Good, 2 for Fair, and 1 for Poor.

Separate cluster analyses were then made of the mean average user ratings for all packages rated by three or more respondents. These cluster analyses were used to determine the ranges of mean average user ratings which can be interpreted as being in the highest cluster, the second, the third, and the fourth or lowest cluster for each characteristic. The mean averages which fall into each cluster group for each characteristic are listed at the bottom of the facing page. The resulting hierarchical cluster groupings for each package are tabulated on the facing page.

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Vendor and Package Name	No. of User Ratings Received	Hierachical Cluster Groupings								
		Reliability	Efficiency	Ease of Installation	Ease of Use	Vendor's Technical Support			Vendor's Maintenance	Overall Satisfaction
						Trouble Shooting	Documentation	User Education		
Gejac, Inc.										
ARSAP	3	2	2	2	3	3	3	4	3	3
Goal Systems										
FLEE/FLIM	14	1	1	1	1	1	1	1	1	1
Henco, Inc.										
INFO	3	1	2	2	1	1	3	3	2	2
Hewlett-Packard Co.										
IMAGE/1000	3	1	2	2	2	1	1	1	2	2
IMAGE/3000	18	1	1	1	1	1	1	2	2	1
KSAM/3000	3	2	2	2	3	3	2	3	2	3
MFG/3000	6	2	2	1	2	2	2	3	2	2
MPE	3	1	2	1	1	2	2	2	2	2
QUERY	3	1	2	2	1	1	1	1	2	2
VIEW/3000	6	1	2	1	1	2	2	3	2	2
Honeywell Information Systems										
DM-IV	6	1	2	2	2	2	3	3	3	2
GCOS	9	1	2	3	2	3	3	3	3	2
IDS	7	2	2	3	3	2	3	3	3	3
IMS	8	1	2	2	2	1	2	3	2	2
TDS	10	1	2	3	2	3	2	3	3	2
TPS	3	2	2	4	3	3	4	3	3	3
IBM Corp.										
Accounts Payable (S/3)	4	2	3	3	2	4	2	3	4	2
Accounts Payable (S/34)	5	2	2	2	2	2	1	3	2	2
Accounts Receivable (S/3)	4	2	2	2	2	3	4	4	3	2
Accounts Receivable (S/34)	4	2	2	3	2	3	2	3	3	2
ACF/VTAM	6	1	2	3	2	3	2	3	3	2
ADF	5	2	3	3	2	2	2	3	3	2
Alpha Search	3	1	2	2	1	1	2	3	3	2
ATMS	3	2	3	3	2	3	3	3	2	2
BOMP (S/3)	12	1	2	3	2	3	2	3	3	2
CICS	103	2	3	3	2	2	2	3	3	2
CMAS (S/3/32/34)	9	2	3	3	3	2	3	3	3	3
COBOL (360/370)	10	1	2	2	2	2	2	3	3	2
COBOL (S/34)	3	1	2	1	1	3	3	3	3	2
COPICS	15	2	3	3	3	3	4	3	3	3
Database Tech (S/3)	7	1	2	3	1	2	1	3	2	2
Database Tech (S/34)	3	1	2	2	1	2	1	2	2	2
Data Dictionary	4	2	3	3	2	2	2	2	2	2
DBOMP	3	3	3	3	3	4	4	4	4	3
DFAS II (S/34)	5	1	2	2	2	2	2	3	2	2
DFAS (S/32)	4	1	3	3	1	3	1	3	3	2
DITTO	3	1	2	2	2	3	4	2	2	2
DMAS II	6	3	3	3	4	3	3	3	3	3
DMS	14	2	3	3	3	4	4	3	3	3
DOS/VS	4	2	2	3	1	1	2	3	2	2
DOS/VS DL/1	12	2	3	3	2	3	3	3	3	2
DOS/VSE	3	2	2	3	2	2	2	3	2	2
EDX	6	2	2	2	2	2	2	4	3	2
EPIC SOCRATES	3	1	2	3	3	3	2	4	3	3
NOTE: The range of average user ratings attributed to each cluster for each characteristic is as follows:										
Cluster 1		3.28 to 4.00	3.45 to 4.00	3.42 to 4.00	3.24 to 4.00	3.20 to 4.00	3.15 to 4.00	3.33 to 4.00	3.60 to 4.00	3.50 to 4.00
Cluster 2		2.66 to 3.27	2.66 to 3.44	2.88 to 3.41	2.71 to 3.23	2.53 to 3.19	2.57 to 3.14	2.85 to 3.32	3.00 to 3.59	2.75 to 3.49
Cluster 3		2.16 to 2.65	2.00 to 2.65	2.00 to 2.87	2.33 to 2.70	2.00 to 2.52	2.14 to 2.56	2.16 to 2.84	2.00 to 2.99	2.00 to 2.74
Cluster 4		Below 2.16	Below 2.00	Below 2.00	Below 2.33	Below 2.00	Below 2.14	Below 2.16	Below 2.00	Below 2.00

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. . . And Their Manufacturers

PROPRIETARY SOFTWARE: USER RATINGS AND CLUSTER ANALYSIS

Vendor and Package Name	No. of User Ratings Received	Mean Average User Ratings								
		Reliability	Efficiency	Ease of Installation	Ease of Use	Vendor's Technical Support: Trouble Shooting	Vendor's Technical Support: Documentation	Vendor's Technical Support: User Education	Vendor's Maintenance	Overall Satisfaction
IBM Corp. (Continued)										
ETSS	7	2.9	2.7	2.0	2.7	2.4	2.6	2.4	2.7	2.4
Fixed Assets (S/3/32/34)	11	2.8	2.5	3.2	2.9	2.3	2.7	2.8	2.3	2.7
General Ledger (S/3)	6	3.2	2.8	2.5	2.2	2.3	3.2	2.5	2.5	2.3
General Ledger (S/34)	6	3.0	2.8	2.3	2.7	2.4	3.0	2.8	3.4	2.7
HCS PCS	5	3.2	2.4	1.8	2.8	2.0	2.4	2.2	2.0	2.8
HFMS	6	3.0	2.7	2.5	2.6	3.0	3.8	3.0	2.8	2.4
ICCF	12	3.2	3.0	2.9	3.6	2.8	2.9	2.4	2.8	3.3
IDES II (S/1)	3	4.0	4.0	3.3	3.3	2.7	3.0	3.0	3.3	3.3
IMS	29	3.4	2.4	2.3	2.5	3.0	2.8	2.7	3.0	2.9
IPICS (S/3)	16	3.3	2.9	2.3	2.5	2.2	2.5	2.0	2.0	2.9
MAPICS Order Entry	3	3.3	2.7	3.7	3.7	2.7	3.3	2.7	3.0	3.3
MAPICS Payroll	7	3.0	2.7	2.3	2.7	2.7	2.2	2.0	2.5	2.7
MAPICS PDM	3	4.0	3.0	2.7	3.0	2.7	3.0	2.7	3.0	2.7
MAPICS (S/34)	40	3.4	2.8	2.9	2.8	2.3	2.9	2.5	2.9	2.7
MMAS (S/32)	3	3.0	2.3	3.3	2.7	2.3	3.3	3.0	3.3	2.7
MMAS-Payroll System	3	3.7	1.7	2.0	2.3	2.0	3.0	3.0	2.3	2.3
MVS/SE	7	3.3	3.1	3.4	3.4	3.0	3.1	2.8	3.3	3.3
Payroll (S/3)	7	3.0	2.9	2.4	2.6	2.5	2.5	2.2	2.3	2.7
Payroll (S/34)	5	3.2	3.0	2.8	2.8	2.8	2.8	2.5	2.8	2.8
PL/1	3	3.3	3.3	3.0	3.3	3.3	3.7	4.0	3.3	3.3
PLANCODE	3	2.0	1.0	2.3	2.3	1.3	2.0	1.7	1.7	1.7
POWER	4	3.8	3.3	3.3	3.3	3.0	3.3	2.5	3.8	3.3
Query By Example	3	2.3	1.0	2.7	3.0	1.7	2.3	2.3	2.3	2.0
RMF	3	3.7	3.7	3.0	3.3	2.3	3.7	3.0	2.7	3.3
RPG-II (S/3)	8	3.9	3.1	3.4	3.8	3.3	3.5	3.3	3.4	3.8
RPG-II (S/34)	9	3.8	3.3	3.6	3.4	3.0	3.1	3.1	3.4	3.4
Screen Design	8	3.8	3.5	3.3	3.0	2.8	2.8	2.3	3.2	3.0
Sort (360/370)	7	3.4	3.0	3.4	3.4	3.3	3.3	3.3	3.3	3.1
Sort (S/3)	5	3.8	3.6	3.0	3.4	3.0	2.8	2.6	3.0	3.8
Source Program Maint. (360/370)	8	3.6	3.1	3.0	3.5	2.8	2.6	2.0	2.9	3.3
Source Lib Maint. (S/3)	16	3.7	3.2	3.0	3.0	2.7	2.6	2.2	2.7	3.1
SPF	18	3.8	3.2	3.3	3.7	3.0	3.3	3.1	3.5	3.6
SSP (S/34)	5	3.8	3.6	3.8	4.0	4.0	3.2	3.4	4.0	4.0
TSO	12	3.4	2.8	2.5	3.4	2.7	2.8	2.6	2.9	3.0
Utilities (S/34)	8	3.6	3.0	3.4	3.5	3.3	3.1	3.0	3.3	3.1
Video/370	4	3.8	3.0	2.8	3.3	3.0	2.5	2.5	3.0	3.0
IMSL, Inc.										
IMSL Library	10	3.4	3.4	3.1	3.0	3.4	3.2	2.6	3.1	3.4
Infodata Systems										
INQUIRE	4	3.3	3.0	3.0	3.7	3.0	3.0	3.3	2.7	3.0
Infonational										
Accounts Payable	5	3.2	2.8	2.8	3.0	2.3	2.8	2.8	2.0	3.0
General Ledger	7	3.3	2.6	3.0	3.0	2.3	3.0	2.7	2.7	3.1
Informatics, Inc.										
ACCOUNTING IV	13	3.0	2.2	2.3	2.7	1.8	2.3	2.3	2.0	2.4
ANSWER/II	4	3.3	2.8	3.0	2.8	3.3	2.8	3.0	3.0	3.0
General Ledger	8	3.3	2.6	2.7	3.1	2.6	2.4	2.3	2.7	3.0
INQUIRY IV/IMS	5	3.0	3.0	3.0	3.2	2.2	2.6	3.0	3.0	2.8
MARK IV	26	3.7	2.7	3.3	3.1	2.8	3.1	3.1	3.0	3.2
Stocks & Bonds	3	3.3	3.0	2.7	2.7	2.7	2.3	2.7	2.3	2.7

LEGEND Mean average user ratings for each package, as tabulated above, were calculated on a scale of 4 for each user rating of Excellent, 3 for Good, 2 for Fair, and 1 for Poor

Separate cluster analyses were then made of the mean average user ratings for all packages rated by three or more respondents These cluster analyses were used to determine the ranges of mean average user ratings which can be interpreted as being in the highest cluster, the second, the third, and the fourth or lowest cluster for each characteristic The mean averages which fall into each cluster group for each characteristic are listed at the bottom of the facing page The resulting hierarchical cluster groupings for each package are tabulated on the facing page

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Vendor and Package Name	No. of User Ratings Received	Hierachical Cluster Groupings								
		Reliability	Efficiency	Ease of Installation	Ease of Use	Vendor's Technical Support: Trouble Shooting	Vendor's Technical Support: Documentation	Vendor's Technical Support: User Education	Vendor's Maintenance	Overall Satisfaction
IBM Corp (Continued)										
ETSS	7	2	2	3	3	3	2	3	3	3
Fixed Assets (S/3/32/34)	11	2	3	2	2	3	2	3	3	3
General Ledger (S/3)	6	2	2	3	4	3	1	3	3	3
General Ledger (S/34)	6	2	2	3	3	3	2	3	2	3
HCS PCS	5	2	3	4	2	3	3	3	3	2
HFMS	6	2	2	3	3	2	1	2	3	3
ICCF	12	2	2	2	1	2	2	3	3	2
IDES II (S/1)	3	1	1	2	1	2	2	2	2	2
IMS	29	1	3	3	3	2	2	3	2	2
IPICS (S/3)	16	1	2	3	3	3	3	4	3	2
MAPICS Order Entry	3	1	2	1	1	2	1	3	2	2
MAPICS Payroll	7	2	2	3	3	2	3	4	3	3
MAPICS PDM	3	1	2	3	2	2	2	3	2	3
MAPICS (S/34)	40	1	2	2	2	3	2	3	3	3
MMAS (S/32)	3	2	3	2	3	3	1	2	2	3
MMAS-Payroll System	3	1	4	3	3	3	2	2	3	3
MVS/SE	7	1	2	1	1	2	2	3	2	2
Payroll (S/3)	7	2	2	3	3	3	3	3	3	3
Payroll (S/34)	5	2	2	3	2	2	2	3	3	2
PL/1	3	1	2	2	1	1	1	1	2	2
PLANCODE	3	4	4	3	3	4	4	4	4	4
POWER	4	1	2	2	1	2	1	3	1	2
Query By Example	3	3	4	3	2	4	3	3	3	3
RMF	3	1	1	2	1	3	1	2	3	2
RPG-II (S/3)	8	1	2	1	1	1	1	2	2	1
RPG-II (S/34)	9	1	2	1	1	2	2	2	2	2
Screen Design	8	1	1	2	2	2	2	3	2	2
Sort (360/370)	7	1	2	1	1	1	1	1	2	2
Sort (S/3)	5	1	1	2	1	2	2	3	2	1
Source Program Maint. (360/370)	8	1	2	2	1	2	2	4	3	2
Source Lib. Maint. (S/3)	16	1	2	2	2	2	2	3	3	2
SPF	18	1	2	2	1	2	1	2	2	1
SSP (S/34)	5	1	1	1	1	1	1	1	1	1
TSO	12	1	2	3	1	2	2	3	3	2
Utilities (S/34)	8	1	2	2	1	1	2	2	2	2
Video/370	4	1	2	3	1	2	3	3	2	2
IMSL, Inc.										
IMSL Library	10	1	2	2	2	1	1	3	2	2
Infodata Systems										
INQUIRE	4	1	2	2	1	2	2	1	3	2
Infonational										
Accounts Payable	5	2	2	3	2	3	2	3	3	2
General Ledger	7	1	3	2	2	3	2	3	3	2
Informatics, Inc.										
ACCOUNTING IV	13	2	3	3	3	4	3	3	3	3
ANSWER/II	4	2	2	2	2	1	2	2	2	2
General Ledger	8	1	3	3	2	2	3	3	3	2
INQUIRY IV/IMS	5	2	2	2	2	3	2	2	2	2
MARK IV	26	1	2	2	2	2	2	2	2	2
Stocks & Bonds	3	1	2	3	3	2	3	3	3	3

NOTE: The range of average user ratings attributed to each cluster for each characteristic is as follows:

	Reliability	Efficiency	Ease of Installation	Ease of Use	Trouble Shooting	Documentation	User Education	Vendor's Maintenance	Overall Satisfaction
Cluster 1	3.28 to 4.00	3.45 to 4.00	3.42 to 4.00	3.24 to 4.00	3.20 to 4.00	3.15 to 4.00	3.33 to 4.00	3.60 to 4.00	3.50 to 4.00
Cluster 2	2.66 to 3.27	2.66 to 3.44	2.88 to 3.41	2.71 to 3.23	2.53 to 3.19	2.57 to 3.14	2.85 to 3.32	3.00 to 3.59	2.75 to 3.49
Cluster 3	2.16 to 2.65	2.00 to 2.65	2.00 to 2.87	2.33 to 2.70	2.00 to 2.52	2.14 to 2.56	2.16 to 2.84	2.00 to 2.99	2.00 to 2.74
Cluster 4	Below 2.16	Below 2.00	Below 2.00	Below 2.33	Below 2.00	Below 2.14	Below 2.16	Below 2.00	Below 2.00

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Users Rate Their Software . .

PROPRIETARY SOFTWARE: USER RATINGS AND CLUSTER ANALYSIS

Vendor and Package Name	No. of User Ratings Received	Mean Average User Ratings								
		Reliability	Efficiency	Ease of Installation	Ease of Use	Vendor's Technical Support			Vendor's Maintenance	Overall Satisfaction
						Trouble Shooting	Documentation	User Education		
Information Associates, Inc.										
Student Records	3	3.7	3.3	2.7	3.0	3.0	3.3	3.0	3.3	3.3
Information Builders										
FOCUS	5	3.4	3.0	3.6	3.6	3.0	2.2	3.5	3.0	3.6
Information Processing, Inc.										
BLIS/COBOL	3	4.0	3.7	3.3	3.7	3.0	3.3	3.7	3.0	3.3
Information Science, Inc										
Human Resources	4	3.0	2.5	1.8	2.5	1.8	2.3	2.8	1.8	2.3
Payroll	7	3.0	2.7	2.3	2.2	2.0	2.5	2.3	2.6	2.7
Innovation Data Processing										
Fast Dump Restore	27	3.9	3.7	3.9	3.8	3.4	3.2	2.8	3.5	3.7
IAM	3	3.7	4.0	3.7	3.3	3.7	3.0	3.0	3.3	3.7
Insurance Systems of America										
ABC	7	3.3	2.9	2.7	3.0	2.6	2.7	3.0	3.0	3.0
OSCARS	4	2.5	2.3	2.3	3.0	2.0	3.0	3.3	2.0	2.3
V-4	4	1.7	2.3	1.8	2.0	2.7	2.0	2.3	2.3	1.7
Integral Systems, Inc.										
Payroll	4	3.0	2.3	2.0	2.5	2.8	2.0	2.0	2.3	3.0
SCOPE	3	3.3	3.3	3.0	2.7	2.3	2.7	2.5	2.3	3.0
Integrated Software										
DISSPLA	6	3.5	2.3	2.8	3.0	3.0	2.8	2.5	2.8	3.0
Intel Corp.										
SYSTEM 2000	10	3.5	2.8	2.8	3.1	2.7	2.9	2.6	3.2	3.1
International Systems										
PAC II	7	3.0	2.4	2.5	2.6	2.7	2.7	3.0	2.5	2.7
Johnson Systems										
JARS/DOS	11	3.5	2.8	2.8	2.7	2.6	2.6	2.3	2.7	2.9
JARS/OS	5	3.4	3.2	3.0	2.4	3.0	2.8	2.3	3.0	3.2
Los Altos Research										
LARC Editor	3	3.7	3.3	3.7	2.7	3.3	2.7	2.3	3.5	3.5
Macro 4, Inc.										
BOOST	3	3.7	3.7	3.3	3.7	3.3	3.3	3.3	3.3	3.3
LOGOUT	4	4.0	4.0	3.8	4.0	3.7	3.7	3.5	3.5	3.8
Management Control Systems										
Practice Management	4	2.5	2.0	2.3	2.3	1.8	1.5	1.5	2.0	2.0
Management Science America										
Accounts Payable	7	3.1	2.4	2.4	2.7	2.3	2.6	2.6	2.6	2.6
Accounts Receivable	4	2.3	2.0	2.5	2.0	1.8	2.8	3.0	2.5	2.3
ALLTAX	8	3.9	3.1	3.1	3.5	3.6	3.3	3.0	4.0	3.6
FICS	7	3.4	2.4	2.4	2.9	2.9	3.1	3.1	3.0	2.9
Fixed Assets	6	3.4	3.0	2.6	3.2	2.8	3.2	3.2	3.0	3.2

LEGEND Mean average user ratings for each package, as tabulated above, were calculated on a scale of 4 for each user rating of Excellent, 3 for Good, 2 for Fair, and 1 for Poor

Separate cluster analyses were then made of the mean average user ratings for all packages rated by three or more respondents These cluster analyses were used to determine the ranges of mean average user ratings which can be interpreted as being in the highest cluster, the second, the third, and the fourth or lowest cluster for each characteristic The mean averages which fall into each cluster group for each characteristic are listed at the bottom of the facing page The resulting hierarchical cluster groupings for each package are tabulated on the facing page

REPRODUCED WITH PERMISSION

Vendor and Package Name	No. of User Ratings Received	Hierachical Cluster Groupings								
		Reliability	Efficiency	Ease of Installation	Ease of Use	Vendor's Technical Support			Vendor's Maintenance	Overall Satisfaction
						Trouble Shooting	Documentation	User Education		
Information Associates, Inc.										
Student Records	3	1	2	3	2	2	1	2	2	2
Information Builders										
FOCUS	5	1	2	1	1	2	3	1	2	1
Information Processing, Inc.										
BLIS/COBOL	3	1	1	2	1	2	1	1	2	2
Information Science, Inc.										
Human Resources	4	2	3	4	3	4	3	3	4	3
Payroll	7	2	2	3	4	3	3	3	3	3
Innovation Data Processing										
Fast Dump Restore	27	1	1	1	1	1	1	2	2	1
IAM	3	1	1	1	1	1	2	2	2	1
Insurance Systems of America										
ABC	7	1	2	3	2	2	2	2	2	2
OSCARS	4	3	3	3	2	3	2	2	3	3
V-4	4	4	3	4	4	2	4	3	3	4
Integral Systems, Inc.										
Payroll	4	2	3	3	3	2	4	4	3	2
SCOPE	3	1	2	2	3	3	2	3	3	2
Integrated Software										
DISSPLA	6	1	3	3	2	2	2	3	3	2
Intel Corp.										
SYSTEM 2000	10	1	2	3	2	2	2	3	2	2
International Systems										
PAC II	7	2	3	3	3	2	2	2	3	3
Johnson Systems										
JARS/DOS	11	1	2	3	2	2	2	3	3	2
JARS/OS	5	1	2	2	3	2	2	3	2	2
Los Altos Research										
LARC Editor	3	1	2	1	3	1	2	3	2	1
Macro 4, Inc.										
BOOST	3	1	1	2	1	1	1	1	2	2
LOGOUT	4	1	1	1	1	1	1	1	2	1
Management Control Systems										
Practice Management	4	3	3	3	4	4	4	4	3	3
Management Science America										
Accounts Payable	7	2	3	3	2	3	2	3	3	3
Accounts Receivable	4	3	3	3	4	4	2	2	3	3
ALLTAX	8	1	2	2	1	1	1	2	1	1
FICS	7	1	3	3	2	2	2	2	2	2
Fixed Assets	6	1	2	3	2	2	1	2	2	2
NOTE: The range of average user ratings attributed to each cluster for each characteristic is as follows										
Cluster 1		3 28 to 4 00	3 45 to 4 00	3 42 to 4 00	3 24 to 4 00	3 20 to 4 00	3 15 to 4 00	3 33 to 4 00	3 60 to 4 00	3 50 to 4 00
Cluster 2		2 66 to 3 27	2 66 to 3 44	2 88 to 3 41	2 71 to 3 23	2 53 to 3 19	2 57 to 3 14	2 85 to 3 32	3 00 to 3 59	2 75 to 3 49
Cluster 3		2 16 to 2 65	2 00 to 2 65	2 00 to 2 87	2 33 to 2 70	2 00 to 2 52	2 14 to 2 56	2 16 to 2 84	2 00 to 2 99	2 00 to 2 74
Cluster 4		Below 2 16	Below 2 00	Below 2 00	Below 2 33	Below 2 00	Below 2 14	Below 2 16	Below 2 00	Below 2 00

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. . . In a Variety of Categories

PROPRIETARY SOFTWARE: USER RATINGS AND CLUSTER ANALYSIS

Vendor and Package Name	No. of User Ratings Received	Mean Average User Ratings								
		Reliability	Efficiency	Ease of Installation	Ease of Use	Vendor's Technical Support			Vendor's Maintenance	Overall Satisfaction
						Trouble Shooting	Documentation	User Education		
Management Science America (Continued)										
General Ledger	31	3.1	2.3	2.5	2.6	2.5	2.7	2.9	2.6	2.6
Human Resources	3	3.7	2.7	2.0	2.7	3.0	2.7	3.3	3.3	3.3
Payroll	35	3.4	2.3	2.3	2.4	2.5	2.8	2.7	2.7	2.7
Personnel	3	3.3	1.7	1.7	2.0	2.3	2.3	2.7	2.7	2.3
Martin Marietta Data Systems										
MAS-H	5	1.6	1.8	1.6	2.2	1.8	1.8	2.4	2.2	1.8
Mathematica Products Group										
RAMIS II	9	3.8	3.1	3.7	3.7	2.9	2.3	2.9	2.9	3.1
John Mathis										
UPG	3	3.7	3.3	3.7	3.7	3.5	3.3	2.7	3.3	3.7
MCBA, INC.										
Accounting Software	12	3.3	2.3	2.9	3.4	2.1	2.5	1.3	2.4	3.3
Payroll	6	3.0	2.2	2.8	3.0	2.0	2.4	1.5	2.5	2.8
McCormack & Dodge Co.										
Accounts Payable Plus	12	3.2	2.8	2.7	2.9	2.6	2.7	2.5	2.7	2.8
Fixed Assets	4	3.0	2.3	2.0	2.5	2.3	2.8	2.8	2.0	2.3
General Ledger Plus	12	3.6	2.5	2.9	2.9	2.8	3.0	3.3	3.0	3.1
McMaster University										
SPSS	3	3.0	3.0	3.0	3.3	2.0	3.3	2.3	2.0	3.0
Micropro Intl. Corp.										
WORD STAR	4	3.5	3.5	3.8	3.0	3.0	3.5	3.0	3.0	3.7
Microsoft										
FORTRAN 80	3	3.7	3.3	3.3	3.0	2.7	3.7	3.3	3.0	3.7
Mid-American Control										
PROMPT	4	3.0	2.0	3.5	2.5	2.0	1.8	1.5	2.3	2.5
Morino Assoc.										
TSO/MON	4	3.3	3.3	3.0	2.8	3.3	3.3	2.8	3.0	3.3
Mountain Software Growers										
EQUAL	4	3.5	3.5	3.8	3.5	3.3	2.8	3.0	3.0	3.0
MSP, Inc.										
DATAMANAGER	5	3.8	3.0	3.0	3.0	2.7	2.8	2.0	2.7	3.0
National CSS										
NOMAD	5	3.8	3.2	3.0	3.6	2.7	2.8	2.8	3.0	3.3
National Information Systems										
DPL	6	3.5	3.0	3.4	3.2	2.2	2.7	2.3	2.7	3.0
NCA Corp.										
FMS-11	5	3.6	3.6	3.8	3.6	3.8	3.4	3.6	3.6	3.6
MS-11	4	3.5	2.8	3.5	3.5	3.0	2.8	3.3	3.5	3.5

LEGEND Mean average user ratings for each package, as tabulated above, were calculated on a scale of 4 for each user rating of Excellent, 3 for Good, 2 for Fair, and 1 for Poor

Separate cluster analyses were then made of the mean average user ratings for all packages rated by three or more respondents. These cluster analyses were used to determine the ranges of mean average user ratings which can be interpreted as being in the highest cluster, the second, the third, and the fourth or lowest cluster for each characteristic. The mean averages which fall into each cluster group for each characteristic are listed at the bottom of the facing page. The resulting hierarchical cluster groupings for each package are tabulated on the facing page.

REPRODUCED WITH PERMISSION

Vendor and Package Name	No. of User Ratings Received	Hierachical Cluster Groupings								
		Reliability	Efficiency	Ease of Installation	Ease of Use	Vendor's Technical Support			Vendor's Maintenance	Overall Satisfaction
						Trouble Shooting	Documentation	User Education		
Management Science America (Continued)										
General Ledger	31	2	3	3	3	2	2	2	3	3
Human Resources	3	1	2	3	3	2	2	1	2	2
Payroll	35	1	3	3	3	3	2	3	3	3
Personnel	3	1	4	4	4	3	3	3	3	3
Martin Marietta Data Systems										
MAS-H	5	4	4	4	4	4	4	3	3	4
Mathematica Products Group										
RAMIS II	9	1	2	1	1	2	3	2	3	2
John Mathis										
UPG	3	1	2	1	1	1	1	3	2	1
MCBA, INC.										
Accounting Software	12	2	3	2	1	3	3	4	3	2
Payroll	6	2	3	3	2	3	3	4	3	2
McCormack & Dodge Co.										
Accounts Payable Plus	12	2	2	3	2	2	2	3	3	2
Fixed Assets	4	2	3	3	3	3	2	3	3	3
General Ledger Plus	12	1	3	2	2	2	2	2	2	2
McMaster University										
SPSS	3	2	2	2	1	3	1	3	3	2
Micropro Intl. Corp.										
WORD STAR	4	1	1	1	2	2	1	2	2	1
Microsoft										
FORTRAN 80	3	1	2	2	2	2	1	1	2	1
Mid-American Control										
PROMPT	4	2	3	1	3	3	4	4	3	3
Morino Assoc.										
TSO/MON	4	2	2	2	2	1	1	3	2	2
Mountain Software Growers										
EQUAL	4	1	1	1	1	1	2	2	2	2
MSP, Inc.										
DATAMANAGER	5	1	2	2	2	2	2	4	3	2
National CSS										
NOMAD	5	1	2	2	1	2	2	3	2	2
National Information Systems										
DPL	6	1	2	2	2	3	2	3	3	2
NCA Corp.										
FMS-11	5	1	1	1	1	1	1	1	1	1
MS-11	4	1	2	1	1	2	2	2	2	1
NOTE: The range of average user ratings attributed to each cluster for each characteristic is as follows:										
Cluster 1		3.28 to 4.00	3.45 to 4.00	3.42 to 4.00	3.24 to 4.00	3.20 to 4.00	3.15 to 4.00	3.33 to 4.00	3.60 to 4.00	3.50 to 4.00
Cluster 2		2.66 to 3.27	2.66 to 3.44	2.88 to 3.41	2.71 to 3.23	2.53 to 3.19	2.57 to 3.14	2.85 to 3.32	3.00 to 3.59	2.75 to 3.49
Cluster 3		2.16 to 2.65	2.00 to 2.65	2.00 to 2.87	2.33 to 2.70	2.00 to 2.52	2.14 to 2.56	2.16 to 2.84	2.00 to 2.99	2.00 to 2.74
Cluster 4		Below 2.16	Below 2.00	Below 2.00	Below 2.33	Below 2.00	Below 2.14	Below 2.16	Below 2.00	Below 2.00

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Users Rate Their Software . . .

PROPRIETARY SOFTWARE: USER RATINGS AND CLUSTER ANALYSIS

Vendor and Package Name	No. of User Ratings Received	Mean Average User Ratings								
						Vendor's Technical Support				
		Reliability	Efficiency	Ease of Installation	Ease of Use	Trouble Shooting	Documentation	User Education	Vendor's Maintenance	Overall Satisfaction
NCI, Inc.										
OWL	7	3.7	3.3	3.2	3.5	2.8	3.0	3.2	3.0	3.0
SLICK	5	3.8	3.8	3.6	3.2	3.6	3.2	2.8	3.3	3.4
NCR Corp.										
CIF	12	3.4	3.1	2.8	2.9	2.0	2.8	2.8	2.6	2.9
CLASS	3	3.3	2.7	2.3	3.3	1.7	2.3	1.3	1.3	1.7
FCS	5	3.2	3.0	2.6	2.6	1.2	2.4	2.2	1.6	2.6
General Ledger	10	3.4	3.1	3.1	3.0	2.9	2.7	2.4	2.7	2.8
IGAS-IWDS	4	2.8	2.3	2.8	3.0	2.0	2.5	2.3	2.8	2.3
IPR	14	3.2	2.5	2.8	2.8	2.2	2.4	2.4	2.5	2.7
Payroll	9	3.5	2.8	3.1	3.1	3.2	3.1	3.0	3.5	3.1
SPIRIT	3	2.7	2.3	2.3	2.3	1.3	1.7	2.0	1.7	2.3
Nichols and Co.										
N5500	3	2.7	1.7	1.7	1.7	1.3	2.0	1.7	1.0	1.3
Nixdorf Computer Corp.										
NCSC DATABASE	3	3.7	3.7	3.7	4.0	3.0	3.0	4.0	3.0	3.7
Optipro, Inc.										
EXTRACTO	3	3.3	3.0	3.3	3.3	2.5	3.0	2.0	2.5	3.0
Oregon Software, Inc.										
PASCAL	4	3.3	3.0	3.7	3.7	3.0	2.3	2.0	2.5	3.3
Oxford Software										
UFO	4	3.0	2.0	3.5	3.5	2.8	3.0	2.3	2.3	3.0
Pansophic Systems										
EASYTRIEVE	57	3.7	3.4	3.4	3.3	3.0	3.1	3.1	3.2	3.4
PANVALET	74	3.8	3.5	3.5	3.5	3.2	3.3	3.1	3.3	3.6
Pennsylvania State Univ.										
MINITAB	3	3.0	3.7	3.0	3.3	3.3	3.0	2.0	3.3	3.3
Policy Management Systems										
PMS	5	3.4	3.2	2.4	3.0	2.8	2.6	2.6	2.2	3.2
The Poise Co.										
POISE	5	3.6	2.2	3.8	3.6	3.3	3.0	3.2	3.3	3.2
Prime Computer, Inc.										
COBOL	3	3.0	2.0	4.0	4.0	4.0	4.0	3.0	3.0	3.0
FORMS	6	3.5	3.3	3.0	3.3	2.8	2.5	2.7	3.2	3.2
PRIME POWER	3	3.3	3.0	3.7	3.3	3.3	2.7	3.0	3.3	3.3
Program Products, Inc.										
Data Analyzer	5	3.8	2.8	3.3	3.3	2.8	3.3	3.3	2.8	3.0
Quasar Systems Ltd.										
QUIZ	3	4.0	3.7	4.0	4.0	3.5	3.3	3.3	3.5	3.5
Rego Software										
ADAGER/3000	3	4.0	3.7	4.0	4.0	4.0	3.3	—	4.0	4.0

LEGEND Mean average user ratings for each package, as tabulated above, were calculated on a scale of 4 for each user rating of Excellent, 3 for Good, 2 for Fair, and 1 for Poor

Separate cluster analyses were then made of the mean average user ratings for all packages rated by three or more respondents These cluster analyses were used to determine the ranges of mean average user ratings which can be interpreted as being in the highest cluster, the second, the third, and the fourth or lowest cluster for each characteristic The mean averages which fall into each cluster group for each characteristic are listed at the bottom of the facing page The resulting hierarchical cluster groupings for each package are tabulated on the facing page

REPRODUCED WITH PERMISSION

Vendor and Package Name	No. of User Ratings Received	Hierachical Cluster Groupings								
						Vendor's Technical Support				
		Reliability	Efficiency	Ease of Installation	Ease of Use	Trouble Shooting	Documentation	User Education	Vendor's Maintenance	Overall Satisfaction
NCI, Inc.										
OWL	7	1	2	2	1	2	2	2	2	2
SLICK	5	1	1	1	2	1	1	3	2	2
NCR Corp.										
CIF	12	1	2	3	2	3	2	3	3	2
CLASS	3	1	2	3	1	4	3	4	4	4
FCS	5	2	2	3	3	4	3	3	4	3
General Ledger	10	1	2	2	2	2	2	3	3	2
IGAS-IWDS	4	2	3	3	2	3	3	3	3	3
IPR	14	2	3	3	2	3	3	3	3	3
Payroll	9	1	2	2	2	1	2	2	2	2
SPIRIT	3	2	3	3	3	4	4	4	4	3
Nichols and Co.										
N5500	3	2	4	4	4	4	4	4	4	4
Nixdorf Computer Corp.										
NCSC DATABASE	3	1	1	1	1	2	2	1	2	1
Optipro, Inc.										
EXTRACTO	3	1	2	2	1	3	2	4	3	2
Oregon Software, Inc.										
PASCAL	4	2	2	1	1	2	3	4	3	2
Oxford Software										
UFO	4	2	3	1	1	2	2	3	3	2
Pansophic Systems										
EASYTRIEVE	57	1	2	1	1	2	2	2	2	2
PANVALET	74	1	1	1	1	1	1	2	2	1
Pennsylvania State Univ.										
MINITAB	3	2	1	2	1	1	2	4	2	2
Policy Management Systems										
PMS	5	1	2	3	2	2	2	3	3	2
The Poise Co.										
POISE	5	1	3	1	1	1	2	2	2	2
Prime Computer, Inc.										
COBOL	3	2	3	1	1	1	1	2	2	2
FORMS	6	1	2	2	1	2	3	3	2	2
PRIME POWER	3	1	2	1	1	1	2	2	2	2
Program Products, Inc.										
Data Analyzer	5	1	2	2	1	2	1	2	3	2
Quasar Systems Ltd.										
QUIZ	3	1	1	1	1	1	1	1	2	1
Rego Software										
ADAGER/3000	3	1	1	1	1	1	1	4	1	1
NOTE: The range of average user ratings attributed to each cluster for each characteristic is as follows:										
Cluster 1		3 28 to 4 00	3 45 to 4 00	3 42 to 4.00	3 24 to 4 00	3 20 to 4 00	3 15 to 4 00	3 33 to 4 00	3 60 to 4 00	3 50 to 4 00
Cluster 2		2 66 to 3 27	2 66 to 3 44	2 88 to 3 41	2 71 to 3 23	2 53 to 3 19	2.57 to 3 14	2.85 to 3 32	3 00 to 3 59	2 75 to 3 49
Cluster 3		2 16 to 2 65	2 00 to 2 65	2 00 to 2 87	2 33 to 2 70	2 00 to 2 52	2 14 to 2 56	2 16 to 2 84	2 00 to 2 99	2 00 to 2 74
Cluster 4		Below 2.16	Below 2 00	Below 2 00	Below 2 33	Below 2 00	Below 2 14	Below 2 16	Below 2 00	Below 2 00

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. . . And Their Manufacturers

PROPRIETARY SOFTWARE: USER RATINGS AND CLUSTER ANALYSIS

Vendor and Package Name	No. of User Ratings Received	Mean Average User Ratings								
		Reliability	Efficiency	Ease of Installation	Ease of Use	Vendor's Technical Support			Vendor's Maintenance	Overall Satisfaction
						Trouble Shooting	Documentation	User Education		
S&H Computer										
TSX	3	3.3	3.0	3.7	3.7	1.7	2.7	2.0	2.0	3.3
SAB, Inc.										
Software 1040	5	3.6	2.8	3.0	3.2	3.2	2.8	2.8	2.8	3.2
SAS Institute										
SAS	33	3.8	3.4	3.6	3.7	3.2	3.1	2.9	3.2	3.6
SDA Products										
INTERCOMM	3	3.3	3.7	2.3	3.0	3.0	2.7	3.0	3.0	3.3
SDI										
EPAT	16	3.8	3.6	3.1	3.7	2.9	3.1	2.8	3.1	3.4
GRASP	4	3.8	3.5	3.5	3.5	3.3	3.0	3.0	3.3	3.5
Softech, Inc.										
PASCAL	3	3.7	3.7	3.3	3.7	2.0	1.7	1.7	2.3	3.3
Software AG of N.A.										
ADABAS	14	3.8	3.1	3.4	3.5	2.9	2.7	3.1	3.2	3.3
COM-PLETE	5	4.0	3.8	3.6	4.0	3.6	3.2	3.6	3.8	3.8
Software House										
System 1022	6	3.3	3.0	3.0	3.8	3.3	3.2	2.2	2.8	3.3
Software International										
Accounts Payable	5	3.4	2.6	2.8	3.0	2.4	2.0	2.0	3.3	3.0
Accounts Receivable	3	3.0	2.0	2.7	2.3	2.3	2.3	2.7	3.0	2.7
General Ledger	39	3.3	2.7	2.7	2.8	2.6	2.6	2.5	2.6	2.8
Software Module Marketing										
DMS/OS	4	3.8	3.5	4.0	3.3	3.5	3.3	3.0	3.3	3.3
Software Pursuits										
DOS/MVT	4	4.0	4.0	3.0	4.0	3.8	2.8	2.8	3.8	4.0
Sperry Univac										
ACS	3	3.3	2.7	3.0	2.3	2.3	1.7	1.7	1.7	1.7
BEM	8	3.7	3.6	3.0	3.4	2.7	2.6	2.2	3.0	3.1
DMS-1100	7	3.3	2.4	2.6	3.1	2.6	2.7	3.0	3.0	3.0
IMS/90	4	3.3	2.8	3.0	3.3	2.3	2.8	2.5	2.8	2.8
UNIS	5	3.0	2.8	2.4	2.8	2.6	2.2	2.4	2.8	2.8
SPSS, Inc.										
SPSS	36	3.6	2.8	3.2	3.2	2.7	3.2	2.7	3.0	3.2
Systems Research, Inc.										
SRI/EDIT	8	3.8	3.3	3.8	3.5	3.3	3.4	3.0	3.6	3.7
System Support Software										
QUIKJOB	10	3.9	3.7	3.8	3.5	3.2	3.2	2.5	3.2	3.2
Texas Instruments										
COBOL	3	3.7	3.3	3.7	4.0	3.7	3.0	3.0	3.3	3.7

LEGEND Mean average user ratings for each package, as tabulated above, were calculated on a scale of 4 for each user rating of Excellent, 3 for Good, 2 for Fair, and 1 for Poor

Separate cluster analyses were then made of the mean average user ratings for all packages rated by three or more respondents These cluster analyses were used to determine the ranges of mean average user ratings which can be interpreted as being in the highest cluster, the second, the third, and the fourth or lowest cluster for each characteristic The mean averages which fall into each cluster group for each characteristic are listed at the bottom of the facing page The resulting hierarchical cluster groupings for each package are tabulated on the facing page

REPRODUCED WITH PERMISSION

Vendor and Package Name	No. of User Ratings Received	Hierachical Cluster Groupings								
		Reliability	Efficiency	Ease of Installation	Ease of Use	Vendor's Technical Support			Vendor's Maintenance	Overall Satisfaction
						Trouble Shooting	Documentation	User Education		
S&H Computer										
TSX	3	1	2	1	1	4	2	4	3	2
SAB, Inc.										
Software 1040	5	1	2	2	2	1	2	3	3	2
SAS Institute										
SAS	33	1	2	1	1	1	2	2	2	1
SDA Products										
INTERCOMM	3	1	1	3	2	2	2	2	2	2
SDI										
EPAT	16	1	1	2	1	2	2	3	2	2
GRASP	4	1	1	1	1	1	2	2	2	1
Softech, Inc.										
PASCAL	3	1	1	2	1	3	4	4	3	2
Software AG of N.A.										
ADABAS	14	1	2	2	1	2	2	2	2	2
COM-PLETE	5	1	1	1	1	1	1	1	1	1
Software House										
System 1022	6	1	2	2	1	1	1	3	3	2
Software International										
Accounts Payable	5	1	3	3	2	3	4	4	2	2
Accounts Receivable	3	2	3	3	3	3	3	3	2	3
General Ledger	39	1	2	3	2	2	3	3	3	2
Software Module Marketing										
DMS/OS	4	1	1	1	1	1	1	2	2	2
Software Pursuits										
DOS/MVT	4	1	1	2	1	1	2	3	1	1
Sperry Univac										
ACS	3	1	2	2	3	3	4	4	4	4
BEM	8	1	1	2	1	2	2	3	2	2
DMS-1100	7	1	3	3	2	2	2	2	2	2
IMS/90	4	2	2	2	1	3	2	3	3	2
UNIS	5	2	2	3	2	2	3	3	3	2
SPSS, Inc.										
SPSS	36	1	2	2	2	2	1	3	2	2
Systems Research, Inc.										
SRI/EDIT	8	1	2	1	1	1	1	2	2	1
System Support Software										
QUIKJOB	10	1	1	1	1	1	1	3	2	2
Texas Instruments										
COBOL	3	1	2	1	1	1	2	2	2	1
NOTE: The range of average user ratings attributed to each cluster for each characteristic is as follows:										
Cluster 1:		3.28 to 4.00	3.45 to 4.00	3.42 to 4.00	3.24 to 4.00	3.20 to 4.00	3.15 to 4.00	3.33 to 4.00	3.60 to 4.00	3.50 to 4.00
Cluster 2:		2.66 to 3.27	2.66 to 3.44	2.88 to 3.41	2.71 to 3.23	2.53 to 3.19	2.57 to 3.14	2.85 to 3.32	3.00 to 3.59	2.75 to 3.49
Cluster 3:		2.16 to 2.65	2.00 to 2.65	2.00 to 2.87	2.33 to 2.70	2.00 to 2.52	2.14 to 2.56	2.16 to 2.84	2.00 to 2.99	2.00 to 2.74
Cluster 4:		Below 2.16	Below 2.00	Below 2.00	Below 2.33	Below 2.00	Below 2.14	Below 2.16	Below 2.00	Below 2.00

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Users Rate Their Software

PROPRIETARY SOFTWARE: USER RATINGS AND CLUSTER ANALYSIS

Vendor and Package Name	No. of User Ratings Received	Mean Average User Ratings								
		Reliability	Efficiency	Ease of Installation	Ease of Use	Vendor's Technical Support			Vendor's Maintenance	Overall Satisfaction
						Trouble Shooting	Documentation	User Education		
Tomark, Inc.										
ABEND-AID	11	3.8	3.6	3.5	3.7	3.4	3.2	3.2	3.2	3.5
TOSC, Inc.										
TOSC4	6	3.7	3.8	3.8	3.7	3.5	3.2	3.2	3.5	3.7
Tower Systems										
DFAST/VS	3	3.7	4.0	3.7	3.7	3.0	3.0	3.0	3.0	3.7
TFAST/VS	12	3.0	3.3	3.2	3.0	2.3	2.5	2.0	2.3	2.5
Transcomm Data Systems										
TOLAS II	3	3.3	3.0	2.0	3.0	1.7	1.3	1.3	1.7	2.0
Turnkey Systems										
TASK/MASTER	3	2.7	3.0	3.0	3.0	2.3	2.0	2.0	2.3	2.7
UCLA										
BMDP	5	3.8	3.8	3.3	3.3	2.0	2.8	2.5	1.8	3.0
United Computing Systems										
FORESIGHT	6	3.8	3.3	3.8	3.3	3.8	2.8	3.2	3.5	3.3
Universal Software, Inc.										
ADAS	4	4.0	3.3	3.8	3.8	3.3	3.3	3.0	3.0	3.3
ASAP	3	3.5	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
University Computer Co.										
FCS	4	3.3	2.0	1.8	1.8	2.3	2.0	2.5	2.5	2.3
Installment Loans	4	3.3	2.0	2.3	2.3	3.0	2.0	2.3	2.7	2.7
UCC-1 (TMS)	22	3.8	3.7	3.3	3.4	3.4	3.0	3.1	3.2	3.4
UCC-2 (DUO)	9	3.6	3.1	2.8	3.4	2.8	2.8	2.8	2.9	3.4
UCC-7	3	3.3	3.3	1.7	3.3	3.3	2.7	2.5	2.5	3.0
Value Computing, Inc.										
COMPUT-A-CHARGE	3	3.3	3.0	3.0	3.0	2.0	2.3	2.3	3.0	3.0
Vector Graphics										
Word Management System	3	4.0	3.3	3.0	2.7	2.5	3.7	3.0	1.0	3.7
Wang Labs.										
Payroll	4	3.7	2.7	2.7	3.0	2.8	2.5	2.8	3.0	3.0
Super Payroll/Personnel	3	3.0	3.5	3.0	2.5	3.0	3.5	3.0	2.5	3.0
Western Electric Co.										
UNIX	5	3.4	3.4	2.6	3.6	1.6	2.8	1.8	1.8	3.6
Westinghouse										
Disk Space Mgr.	5	3.4	3.2	3.2	3.2	2.8	2.8	2.3	2.8	3.0
Disk Utility	12	3.8	3.7	3.7	3.5	3.4	3.2	3.2	3.6	3.4
Job Monitor II	3	3.0	3.0	3.7	3.3	3.0	3.0	3.0	3.3	3.0
SCEPTER	6	4.0	3.7	3.3	3.7	3.5	3.2	3.3	3.7	3.8
WESTI	11	3.8	3.6	3.5	3.5	3.6	3.4	3.2	3.6	3.6
Whitlow Computer Systems										
SYNCSORT	67	3.8	3.7	3.5	3.7	3.3	3.3	3.1	3.3	3.6

LEGEND Mean average user ratings for each package, as tabulated above, were calculated on a scale of 4 for each user rating of Excellent, 3 for Good, 2 for Fair, and 1 for Poor

Separate cluster analyses were then made of the mean average user ratings for all packages rated by three or more respondents These cluster analyses were used to determine the ranges of mean average user ratings which can be interpreted as being in the highest cluster, the second, the third, and the fourth or lowest cluster for each characteristic The mean averages which fall into each cluster group for each characteristic are listed at the bottom of the facing page The resulting hierarchical cluster groupings for each package are tabulated on the facing page

REPRODUCED WITH PERMISSION

Vendor and Package Name	No. of User Ratings Received	Hierachical Cluster Groupings								
		Reliability	Efficiency	Ease of Installation	Ease of Use	Vendor's Technical Support			Vendor's Maintenance	Overall Satisfaction
						Trouble Shooting	Documentation	User Education		
Tomark, Inc.										
ABEND-AID	11	1	1	1	1	1	1	2	2	1
TOSC, Inc.										
TOSC4	6	1	1	1	1	1	1	2	2	1
Tower Systems										
DFAST/VS	3	1	1	1	1	2	2	2	2	1
TFAST/VS	12	2	2	2	2	3	3	4	3	3
Transcomm Data Systems										
TOLAS II	3	1	2	3	2	4	4	4	4	3
Turnkey Systems										
TASK/MASTER	3	2	2	2	2	3	4	4	3	3
UCLA										
BMDP	5	1	1	2	1	3	2	3	4	2
United Computing Systems										
FORESIGHT	6	1	2	1	1	1	2	2	2	2
Universal Software, Inc.										
ADAS	4	1	2	1	1	1	1	2	2	2
ASAP	3	1	2	2	2	2	2	2	2	2
University Computer Co.										
FCS	4	2	3	4	4	3	4	3	3	3
Installment Loans	4	1	3	3	3	2	4	3	3	3
UCC-1 (TMS)	22	1	1	2	1	1	2	2	2	2
UCC-2 (DUO)	9	1	2	3	1	2	2	3	3	2
UCC-7	3	1	2	4	1	1	2	3	3	2
Value Computing, Inc.										
COMPUT-A-CHARGE	3	1	2	2	2	3	3	3	2	2
Vector Graphics										
Word Management System	3	1	2	2	3	3	1	2	4	1
Wang Labs.										
Payroll	4	1	2	3	2	2	3	3	2	2
Super Payroll/Personnel	3	2	1	2	3	2	1	2	3	2
Western Electric Co.										
UNIX	5	1	2	3	1	4	2	4	4	1
Westinghouse										
Disk Space Mgr.	5	1	2	2	2	2	2	3	3	2
Disk Utility	12	1	1	1	1	1	1	2	2	2
Job Monitor II	3	2	2	1	1	2	2	2	2	2
SCEPTER	6	1	1	2	1	1	1	1	1	1
WESTI	11	1	1	1	1	1	1	2	1	1
Whitlow Computer Systems										
SYNCSORT	67	1	1	1	1	1	1	2	2	1
NOTE. The range of average user ratings attributed to each cluster for each characteristic is as follows:										
Cluster 1		3.28 to 4.00	3.45 to 4.00	3.42 to 4.00	3.24 to 4.00	3.20 to 4.00	3.15 to 4.00	3.33 to 4.00	3.60 to 4.00	3.50 to 4.00
Cluster 2		2.66 to 3.27	2.66 to 3.44	2.88 to 3.41	2.71 to 3.23	2.53 to 3.19	2.57 to 3.14	2.85 to 3.32	3.00 to 3.59	2.75 to 3.49
Cluster 3		2.16 to 2.65	2.00 to 2.65	2.00 to 2.87	2.33 to 2.70	2.00 to 2.52	2.14 to 2.56	2.16 to 2.84	2.00 to 2.99	2.00 to 2.74
Cluster 4		Below 2.16	Below 2.00	Below 2.00	Below 2.33	Below 2.00	Below 2.14	Below 2.16	Below 2.00	Below 2.00

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Auditing Function Crucial

New Technology Seen Threatening Security

By Tom Henkel
CW Staff

MONTREAL — Higher storage densities, satellite communications and a growing base of intelligent terminals make information systems more vulnerable, according to Patrick Sullivan, director of the Technology Analysis Group at Advanced Computer Techniques Corp. (ACT).

Speaking at ACT's Future Systems Forum Canada, Sullivan said management must evaluate not only the processors and programs, but the users and all the procedures that make up a system, when it comes to creating a workable security system.

Noting that system security deals with protecting information, programs and resources — which include the CPU, memory and storage medium — Sullivan said the auditing function is one of the most powerful tools available to management to make sure systems are used properly.

System management and accounting controls, which interweave with system security and system auditability functions, will provide management with the type of control necessary to oversee the entire information flow, Sullivan said.

Potential Threats

And the scope of security violations is changing too. Sullivan said 50% to 80% of security problems can be categorized as errors or omissions. Other potential threats include (in order of importance) dishonest employees, fire, disgruntled employees (different from dishonest employees in that in the former category, the security violation tends to be theft, and in the latter, an unhappy employee, who may have been fired, could destroy data files and the like to get back at the company) water damage and external attack, according to Sullivan.

Citing Federal Bureau of Investigation figures that show $500 million worth of damage is annually caused to information systems as a result of external attack, Sullivan estimated that figure is about 1% of the total annual damage. The other cases go unreported, he said.

Too often, management views designing and building an information control system as wasted overhead. In fact, Sullivan said, a system control program is one of the best investments management can make because it produces a continuous payback and makes the overall operation of the information system more efficient.

In building a system control program, management should look at four basic areas: auditability, adequacy, accuracy and completeness. That means management should beef up some areas, like creating usage accounting and operations accounting functions. And it should institute new controls, like data entry and output controls, program preparation, testing and submission controls and library storage controls, Sullivan said.

Another area management should take a closer look at is its failure/recovery and restart controls. Sullivan said surprisingly few shops even have a failure/recovery program, and even fewer shops know such a program will actually work. As an example, he cited a firm that had tested its failure/recovery plan and estimated it could be functional inside of a few hours. It failed to consider how long it would take to switch communications lines if a problem developed there. Hence the firm was not adequately prepared, Sullivan said.

Other areas deserving of security controls are maintenance (modification and update controls), network traffic controls and data base administration controls, Sullivan noted.

Keeping information systems secure in the future will be even harder than it is today, Sullivan said, noting new areas of technology such as more sophisticated office systems, electronic mail, electronic funds transfer, specialized networks and public data networks will further complicate the security issue.

The Future Systems Forum Canada was sponsored by ACT in cooperation with Whitsed Publishing Ltd., Toronto, Canada.

Cuba to Host Spin Meeting

ROME — The 10th General Assembly of the Intergovernmental Bureau for Informatics (IBI) has accepted the invitation from the government of Cuba to hold the second Intergovernmental Conference on Strategies and Policies in Informatics (Spin) in Havana in the spring of 1983.

Issues to be discussed at this meeting are expected to include economic implications of informatics, particularly in relation to industrialization; educational needs of developing countries; transborder data flow issues; and new informatics technological developments.

All members of the United Nations will be invited to send official delegations to the conference. Additional information will be forthcoming from IBI, 23 Viale Civilta del Lavoro, 00144 Rome, Italy.

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DEAN WITTER REYNOLDS INC.

December 15, 1980

38 delivers

The productivity advances of IBM's new System/38 are being confirmed in early installations.

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And customers have started delivering comments like these to IBM.

"**I created a special equipment report in 15 minutes flat. Before, it would have taken a day and a half of programming.**"—Chuck Petter, Data Processing Manager, Road Machinery and Supplies Company, Minneapolis.

"**System/38 makes our programming staff more productive. We've developed applications in weeks instead of months. And they're more effective.**"—Norbert Gottenberg, V.P.-Planning & Management Information Systems, United Merchants and Manufacturers, New York City.

"**The System/38 significantly reduced the amount of code necessary to write a program and the time and effort required to move into new applications. We're extremely enthusiastic.**"—Larry Petterson, Director of Data Processing, St. Olaf College, Northfield, Minnesota.

And we're enthusiastic, too.

Because the IBM General Systems Division's versatile new System/38 is a compact system with many large computer features. Such as distributed online work stations so users don't have to go to the computer; a central data base that makes information easier to retrieve, revise and use; the Control Program Facility, which automatically monitors and manages the flow and processing of data; online program testing, so programs can now be debugged as normal processing continues.

And System/38 has advanced features rarely found in any computer, large or small. Like Single Level Storage, which treats all storage as a single unit and automatically keeps track of it.

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General Systems Division

In New York Police Department

City's Gun-Toting Programmers Wear Two Hats

By Bob Johnson
CW Staff

NEW YORK — Certain systems programmers here go to work carrying guns. They carry them not because they're particularly fearful of crime, but because it is part of their jobs. They're cops.

About half the people involved in the data processing functions of the New York City Police Department have dual positions — police officers and DP professionals. A cop may be debugging a program one day and be involved in solving a crime the next.

An integral part of their daily work is operating and maintaining the 911 emergency telephone service. More than 17,500 calls are dialed into 911 each day and are acted upon in less than two seconds by the department's Communication Section, civilian technicians and a dedicated IBM 370/148.

Using an IBM software package called the Special Police Response Inquiry Network (Sprint), based on the Airlines Control Program, each city borough is monitored in separate sections.

Every street, cross street and avenue of New York City is included in the Sprint data base, allowing a technician to determine the exact location in which an emergency is occurring.

The task of accumulating data on all these streets was time-consuming and harrowing, according to Police Officer Charles Karwelies. "We had to go out to every borough and document the names of streets and avenues. Sometimes this was confusing because some streets have two names and some are simply dirt roads."

This immense data base is used not only by the police department, but has also become a clearinghouse of sorts for many city agencies needing accurate data. IBM initially set up the data base, but it is now monitored by police department personnel and used frequently, as in the 911 function.

Camaraderie Helps

Although the system has helped a great deal in dispatching police, the human element is still very important. "The civilian technicians learn to think like police officers; they begin to anticipate true needs and can judge real emergencies," said Police Officer Gerry Sweikata of the Communications Section.

Such a combination of specialties as cop and DP professional can sometimes cause problems, but the sense of camaraderie among the police officers compensates for the dual-job pressures. It's a "get-it-done" attitude stemming from their police force training.

A police officer can enter DP by having either related experience or some college background. However, all must perform on the street for an unspecified time before becoming eligible.

Unfortunately, the dual role is developing into a bigger problem, according to some members of the department. Police officers paid by the city receive no further compensation for being data processing professionals. Thus, a policeman/programmer currently earns about $20,000, while the salary of a programmer in private industry is often substantially higher. Police officers who are not so gung-ho about service to the city are reportedly being lured into greener financial pastures.

As a result, the data center becomes an excellent place to learn, but after a police officer gains enough experience he has the tools to seek DP jobs privately, a situation that could eventually hurt the department's overall DP operations, according to some department members.

A handful of systems programmers/analysts now thoroughly know the department's data bases, which include many more than just Sprint. If they were to leave, a crisis situation might be precipitated in the event of an emergency without adequately trained staff, these same staffers said.

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SBS Sees Wideband Use Easing Net Bottlenecks

By Phil Hirsch
CW Washington Bureau

GAITHERSBURG, Md. — Increased use of wideband satellite transmission channels in the 1980s will greatly reduce the difficulty of using data communications, according to Robert C. Hall, president of Satellite Business Systems (SBS). Addressing a computer networking symposium here last week, Hall also predicted that wideband channels would lower unit data transmission costs significantly.

Today's difficulty comes from "the sheer number of choices" available to the network designer and from the proliferation of "new devices and capabilities" which are often incompatible. Another factor is "the curse of communications software" — how to get it, how to write it, how to find people with the right expertise and how to hold on to them "— without sending the manpower budget through the roof."

The result is that toward the end of the 1970s, "data communications started looking like a science of the occult, complete with a priesthood of free-lance specialists who offered to make things right, or at least to tell you how things went wrong," Hall said.

Major Bottlenecks

The wideband transmission networks that SBS and other carriers — such as Telenet, Tymnet and AT&T — will offer in the 1980s promise to bypass these "bottlenecks" in three major ways, he added: They will offer transparent interfaces, network-resident communications processing and turnkey contracts, thus enabling the user to get out from under much of the technical complexity he must contend with today.

One benefit of this change is that users' "software efforts increasingly will be devoted to [their] unique applications rather than to the routine requirements of interfacing." Another benefit: Users will be able to add new applications incrementally. "Such additions [should] actually improve the cost-effectiveness of the total system."

Another bottleneck likely to be broken in the '80s is the data communications user's dependence on telephone company-provided analog local loops. Optical fiber cable and microwave alternatives have been developed by a number of vendors — for example, Xerox Corp.'s Xten and Ethernet systems and Network Systems Corp.'s Hyperchannel.

Hall reported that his company has procured a prototype Hyperchannel adapter and, next year, will conduct a transcontinental data communications test utilizing a 56K bit/sec satellite channel interfaced in New York City to a coaxial cable local loop system, and in San Francisco to both cable and microwave local loops.

Wideband Costs

Regarding communication costs, he predicted that greater use of wideband facilities will cause the price/performance of communication channels to improve at a rate "comparable to the [present] price/performance trend in computer electronics."

Increased use will come initially from integration of voice, data and image transmissions now being carried over separate message paths, Hall said. As wideband traffic grows and rates decline, the lower prices will make electronic mail, computer networking, and video teleconferencing feasible for many companies that today find the costs prohibitive, he added.

Toward the end of the 1970s, 'data communications started looking like a science of the occult, complete with a priesthood of free-lance specialists who offered to make things right, or at least to tell you how things went wrong.'

Terminals and interfaces to support multimegabit transmission speeds have already been developed, Hall said. SBS, for example, is demonstrating a facsimile machine that transmits 70 page/min "and with quality comparable to a well-tuned office copier." The company's "data exchange controller," which interfaces users' terminals at the earth station to a satellite long-haul channel, can handle single-channel data rates of up to 6.3M bit/-sec at an error rate of up to $1{:}10^{-12}$.

Through reprogramming, even higher speeds are possible. Use of a packetized transmission format allows voice, data, facsimile and/or video teleconferencing information to be transmitted in digital form simultaneously over each of these channels.

One result of the switch to wideband, Hall said, is that load sharing among dispersed computers will become more attractive. He also expects to see an end to the long-standing controversy over distributed data processing.

"Distributed processing, as the argument goes, is good because it puts computing power at the locations where it's most useful. But it's bad because it detracts from . . . centralized control . . . The solution may well reside in . . . megabit channel rates and [their] switched interconnectivity.

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Avoid Impersonal Attitudes

Expert Stresses Workers' Input in Automation

By Bruce Hoard
CW Staff

NEW YORK — Workers should have increased input on the implementation of labor-saving technologies and managers must avoid impersonal attitudes, Dr. Bruce Gilchrist of Columbia University's Center for Computing Activities said in an interview here recently.

Gilchrist, a widely published author on the effect of automation on employment who calls himself a "concerned computer advocate," also claimed that the growth of automation does not portend wide-scale unemployment for U.S. workers.

Automation has been developing in the U.S. for the past 150 years, but "it's the acceleration of automation that concerns me now, especially when the gross economy is not expanding. If we had enormous demand, it would take care of our problems."

Asked how much input workers should have on the implementation of new technologies in the workplace, he replied, "A great deal." A good system design is dependent on the workers who will actually operate it, he said.

Noting that few systems throw out everyone from the previous system and start from scratch, he commented, "You have to get down below the managerial level and talk to people. It's not an either-or situation any longer because it's not the 19th century."

As an example of worker input, he cited the Volvo automobile company in Sweden where groups of workers are responsible for managing major segments of the production process. In Norway, a law requires workers to be "involved" with the implementation of new technologies, he said.

Increased automation is not leading to structural unemployment and a burgeoning number of white-collar jobs at the expense of blue-collar employment, he claimed. To draw such a distinction would be a "tragic dichotomy," he said.

The manufacturing work force has been shrinking historically, will continue to shrink and currently constitutes less than 30% of the workforce, Gilchrist declared. However, the white-collar work force is also threatened by automation, he added.

The demand for unskilled labor is going to drop as more tasks are automated. Displaced workers will have to educate themselves or face the specter of long-term unemployment, he explained. "The question is, what skills should they be taught?" he asked.

Employment Shifts

More and more automation does not mean we will reach a point where so many jobs have been automated, it will be impossible to find new positions for displaced workers, Gilchrist asserted.

Despite the recent vicissitudes of the U.S. economy, it has remained basically resilient and is likely to remain that way, he said. Faced with 7% to 8% unemployment, the number of people employed has grown over each of the past 30 years.

If automation was the insatiable juggernaut that some have painted it to be, unions would have mounted a serious challenge to its proliferation, Gilchrist commented. As it is, the unions have been more interested in wage levels than the number of employed union members, he claimed.

Both government and unions are heavily involved with automation efforts in Japan and West Germany, and, "both those countries are held up as the epitomies of success, so it's paradoxical to say unions and government should go away."

"What we need now is leadership," he said.

Power Failure Downs Norad

COLORADO SPRINGS, Colo. — The North American Air Defense Command (Norad) computer system, which has been blamed for several false attack warnings in recent months, fell victim to a power dropout here recently.

The power failure, which Norad said was caused by a failure in a commercial power line, knocked out an internal relay switch and caused two diesel generators, which run along with the commercial power supply, to fail. Although Norad was able to restore enough power to operate overhead lighting within 15 minutes, the computer system was down for more than an hour, a spokesman said.

Norad said it was a coincidence that the commercial power, which Norad uses to save money, failed at the same time as the facility's backup power units. Power was restored when the two diesel generators were restarted, along with a third from Norad's bank of six backup diesel generators, according to the spokesman.

The computer system, which is a Honeywell, Inc.-built processor designed for Norad, was not damaged in the failure, but some data was lost and later restored, according to Norad.

A spokesman said Norad switched to a manual voice communication system when the computerized warning system failed. No injuries were reported.

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This issue of *Computerworld Extra!* will focus its entire editorial content on a single subject: "Communications Systems in the 80's." Top experts from all areas of the communications field will write magazine-length articles on a variety of topics including: Integrating Voice and Data Networks; The State of Videotex in the US, Uk, France, and Canada; Network Management; Satellite Technology in the 80's; The Past and Future of the Communications Act and Federal regulations; Network Standards and Protocols; and Future Directions in Telecommunications Technology. Plus, there'll be Wrap-up and Analysis articles for Data Communications Software, Data Terminal Equipment, and Data Communications Equipment.

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Data Comm Terminals-Smart	34	22,000	33	83,000
Multiplexers	30	19,200	29	73,000
Distributed Processing Equipment	28	17,900	18	45,000
Computer Services and Timesharing	26	16,600	20	50,000
Teleprinters	26	16,600	15	38,000
Graphics Terminals	22	14,100	7	18,000
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Source: "A Profile of Computerworld Subscribers and their Companies" — Becker Research.

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Peter P. Blozis (right) is Wilson's Vice President, Information Services Division. Lea Edmunds is Technical Services Manager.

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Where to Find Data on Computer Groups?

Turnaround Time

By Larry E. Long

Q In an earlier column, you were looking for DP and computer organizations. There is a book that provides all the information you requested — *The Encyclopedia of Associations*, published by Gale Research of Ann Arbor, Mich. It is available in all public and university libraries and most corporate libraries.

If the organizations themselves do not respond to your query, try this book to help your readers.

A *The Encyclopedia of Associations* is far from comprehensive. My suspicions were confirmed that this and other such compilations of associations have omitted a good many professional DP and computer societies and organizations.

Although many have responded to my initial request, I would invite those who have not responded and wish to make known their organization to the DP community (through *Computerworld*) to do so. Beginning with this issue (see Page 29), CW will publish periodically a brief description of those organizations that respond.

Q **I am a senior analyst in the computer department of a large company. We are responsible for providing services to all departments within the company. I have been asked to initiate a review of the procedures currently in place to develop cost estimates for the design and implementation of new systems. Our current procedures have not been yielding consistently accurate estimates. Can you recommend any references on procedures being used successfully elsewhere?**

A There are several prerequisites to making consistently accurate cost estimates. A system development methodology is necessary to provide the framework (phases, activities and milestones) for estimation and the collection of historical data. To minimize in-progress revisions and, therefore, variations in estimation, the feasibility study should include a preliminary general systems design that provides sufficient detail to define the project's scope. Estimation is still very much an art and not a science; the wisdom of experienced personnel is a must.

One book that presents a methodology and encourages a realistic estimation via a preliminary design is *Data Processing Documentation and Procedures Manual* by a certain CW columnist who responds to inquiries (Reston Publishing Co., 11480 Sunset Hills Road, Reston, Va. 22090).

Q **Your answer to the question about whether a knowledge of programming is a requirement to be a good systems analyst was well accepted where I work, but we go one step further. Entry-level people aspiring to be programmers and analysts start as operator trainees and work as operators for six months before they begin their programming training. During that six months, few of us saw the need for machine room experience. In retrospect, just about everybody deemed the experience invaluable. We highly recommend it.**

A Your successes may prompt DP managers to rethink their career development programs for programmers and analysts. Thanks for writing.

Q **Where does one obtain information about DP positions in the U.S. Government?**

A The Office of Personnel Management offers federal employment information through a nationwide network of Federal Job Information Centers. These centers provide information on federal jobs and employment opportunities. I would recommend that you contact the Federal Job Information Center nearest you (Chicago, 312-353-5136) and request information on DP careers and employment opportunities.

The federal government has moved very slowly in its efforts to update job classifications for the volatile field of DP. The "computer specialist" is the catchall for most professional DP positions. Existing position descriptions are inadequate to describe the scope and type of DP jobs within the federal government.

The Federal Job Information Center can provide information on a limited set of DP jobs. To obtain more detailed information about a specific job, you will probably need to contact the agency offering the job.

Have a question? Send it to Larry Long, Editorial Department, Computerworld, *375 Cochituate Road, Rte. 30, Framingham, Mass. 01701.*

Long is a professor at Lehigh University, a DP consultant and author.

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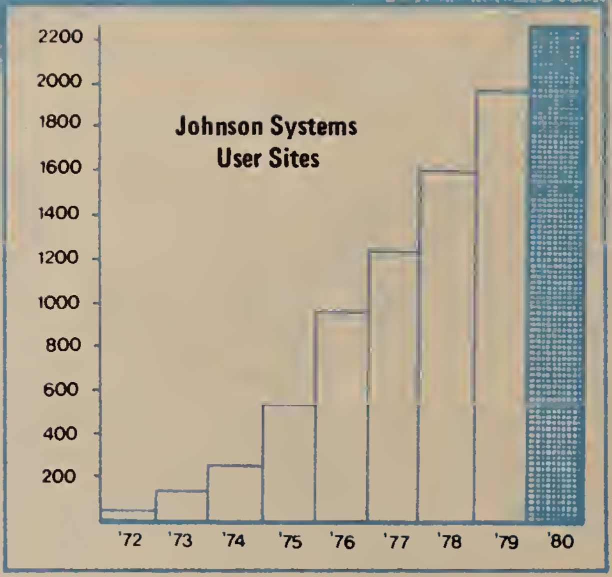

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Larry Long's List of Professional Groups

Larry Long is compiling a list of professional DP/computer societies and organizations. His compilation begins in this issue and will be continued in future columns. To be included, societies and organizations should send a brief description of their purposes and objectives to Larry Long, Editorial Department, Computerworld, *375 Cochituate Road, Rt. 30, Framingham, Mass. 01701.*

— — —

- **Association for Systems Management (ASM).**

Purpose and objectives: The Association for Systems Management (ASM) is the international professional organization dedicated to the advancement and self-renewal of systems analysts and systems managers in business, industry and government. Our primary objective is to provide for the continuing education needs of the systems practitioner. There are 25 chapters organized into 21 division councils in Canada, the U.S. and Venezuela.

ASM is dedicated to promoting a wider understanding of the systems analysis function as a tool to more effective management, to encouraging high standards of education and performance among its members and to enlightening the general business community on the contribution of ASM members. The major functions of ASM are collecting, editing and transmitting pertinent information through periodicals, books, seminars, films and papers.

For more information: A. James Andrews, Director of Publications, Association for Systems Management, 24587 Bagley Road, Cleveland, Ohio 44138, (216) 243-6900.

- **National Association for State Information Systems (Nasis).**

Purpose and objectives: Nasis is an organization having as its members the 50 states of the U.S., its territories and the District of Columbia. The Canadian provinces of British Columbia, Ontario and Quebec participate as associate members, while a correspondent relationship is maintained with many other foreign nations.

Nasis' central purpose is assistance to state government in providing effective service to its citizenry.

For more information: Judie Parish, Executive Assistant, National Association for State Information Systems, P.O. Box 11910, Lexington, Ky. 40578, (606) 252-2291.

- **Women in Data Processing (WDP).**

Purpose and objectives: WDP is a nonprofit, professional organization registered in the state of California. Our membership of men and women is spread throughout the state and extends into other states as well. The professional level of the members ranges from beginning data entry persons through department directors and covers all aspects of the data processing profession. We also have student memberships.

WDP members are career professionals interested in promoting the entry and advancement of women in the field of data processing. WDP offers seminars and workshops on state-of-the-art technology, personal development, educational opportunities and management practices.

For more information: Saxon Douda, Secretary, Women in Data Processing, P.O. Box 8117, San Diego, Calif. 92102.

- **Independent Computer Consultants Association (ICCA).**

Purpose and objectives: The ICCA is a national, not-for-profit, professional organization supporting independent businessmen and women across the country.

A major goal of the association is to promote professionalism within the industry. Every member of ICCA supports our code of ethics.

The ICCA publishes the National Directory of Computing and Consulting Services. ICCA also publishes a quarterly newsletter and holds an annual conference that focuses on the needs and problems of the membership.

For more information: Steven A. Epner, President, Independent Computer Consultants Association, P.O. Box 27412, St. Louis, Mo. 63141.

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Data Recovery Method Salvages 'Crucial' Files From MGM Grand

By Jeffry Beeler
CW West Coast Bureau

LAS VEGAS — A little-used data recovery method has apparently enabled the fire-ravaged MGM Grand Hotel to salvage several crucial disk files that otherwise would probably have been lost forever in the company's fatal Nov. 21 blaze.

The recovery procedure is credited with rescuing the last remaining copy of the MGM Grand's accounts receivable, accounts payable and guest registration files. All other copies of those records, including backup files, are believed to have been destroyed in the same fire that killed more than 80 of the hotel's guests [CW, Dec. 1].

Before the blaze struck, the files in question had resided on two disk packs. But on Nov. 21, both packs sustained a level of fire-related damage most users and vendors historically have considered beyond repair.

One of the packs was severely gouged and both were heavily contaminated by smoke, according to Lee Iles, field operations manager for the Santa Ana, Calif.-based Electronic Engineering Co. (Eeco), which supplies the MGM Grand's guest reservation system.

At first, MGM Grand officials reportedly feared that the magnitude of the damage would make data recovery impossible and thus leave the hotel's vital files "trapped" forever inside the two battered disk packs. But, with the help of a salvaging procedure developed and supervised by David Brown, an outside consultant, the MGM Grand was able to refurbish the packs, regain access to the apparently lost files and copy their contents to a standby, uncontaminated disk system, Iles said.

The refurbishing operation was not intended to return the contaminated packs to their original, mint condition, nor was such a total restoration necessary. All that was required was for enough of the damage to be repaired to allow the packs to be used one more time without causing a head crash, Iles said.

After the packs had been successfully reread and their files copied, they ceased to be useful to the hotel and were immediately discarded.

Permanent Loss Avoided

Eeco was quickly able to replace the hotel's ruined reservations system, which was built around a 64K-byte Data General Corp. Nova 3 and 50M-byte Century Data Systems, Inc. T50 disk units. But the problem of salvaging the hotel's valuable data files proved a much tougher nut for Eeco to crack. When the floor of the MGM Grand's computing department collapsed, smoke quickly filled the room and contaminated most of the hotel's disk packs, including the two containing its receivables, payables and guest directories.

Fearful that the contents of the two disk packs might be lost permanently, the hotel's management sought help from Eeco, which referred the matter to the Data Maintenance Division of Randomex, Inc., a Long Beach, Calif.-based disk-systems service firm. Randomex in turn sought the advice of outside consultant Brown, who serves as technical support manager for the Covina, Calif., office of Conrac Corp., the terminal maker.

For a fee of $1,200, Brown hand-cleaned the dirty packs and then loaded the read/write heads in the middle of the disks before bringing the heads back to "sector zero" by software, Iles said.

Disasters Are His Specialty

COVINA, Calif. — The fire-stricken MGM Grand Hotel is apparently only the latest in a long line of companies to have benefited from a post-disaster data recovery procedure developed by disk systems consultant David Brown.

During the last three years, Brown has tested his "proprietary" technique at 67 user installations, and only once has he failed to achieve at least partial success, he claimed.

Brown began developing the procedure in 1977 while pulling a two-year stint as manager of Memorex Corp.'s worldwide field engineering organization. Since then, he has refined the process gradually to the point where he can often recover data files from what many users have traditionally considered irreparably damaged disk packs. Brown currently works for Conrac Corp. as a technical support manager.

Almost all of Brown's calls come from users who have suffered some form of catastrophic disk pack damage.

Asked to explain how his data recovery procedure works, Brown declined to answer at length for fear of possibly divulging "proprietary" details. But he did disclose that the method consists of three main steps.

First, he inspects a damaged pack to assess the chances of a successful repair. During exceptionally violent crashes, some packs have so much of their data-bearing oxide stripped away that not even the most proficient salvaging operation can rescue them, Brown said.

Second, he refurbishes the pack to the point where read/write heads can once again fly safely over the unit's recording surfaces. Using several proprietary circuits, he also reportedly boosts the drive's read current to make it sensitive enough to detect any data remaining on the pack's damaged sectors.

Third, after the pack has been fully restored, Brown overrides the software safety checks that otherwise would prevent the crashed unit from being reinitialized.

Users wanting additional information about Brown's data recovery procedure can write to the developer at P.O. Box 3392, Anaheim, Calif. 92803.

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Firms Supporting Bell Terminals

AT&T Guide to List On-Line Service Bureaus

By Phil Hirsch

CW Washington Bureau

WASHINGTON, D.C. — AT&T will begin publishing a directory early next year listing the names of on-line service bureaus and other information services firms that support Bell terminals.

The basic aim of the publication was explained by Market Manager Peter Bartolotta.

Prospective users of Bell's newer data communications producs, such as the Dataspeed 40/4 and 4540, frequently lack in-house computer resource to fully exploit the terminals' capabilities, he pointed out.

Vendors of on-line data base and service bureau services typically interface with Model 28 and 33 teletypewriters, but are not aware of the revenue opportunities implicit in supporting the new devices.

The directory, by facilitating communication between both groups, is meant to encourage each to make greater use of these products, a Bell spokesman said.

The directory will be introduced during the first quarter of 1981. It will be distributed only to Bell operating company account executives.

Bell Contracts

When the need for a business application is identified by an account executive and a vendor capable of satisfying the requirement is not already listed in the directory, AT&T will attempt to find a suitable supplier by contacting the industry.

Bartolotta said AT&T is thinking about making a version of the new directory available to the public.

On-Line Directory

In addition, since only 400 firms will be in the initial publication and there are 8,000 to 10,000 companies offering information services in the U.S., "we will almost certainly be forced sooner or later to put the directory on-line," Bell said.

However, only Bell operating company account executives will have access to this on-line data base, he added.

Moreover, AT&T has "no plans" to take orders for information services listed in the directory, the firm said.

DEC Announces Seminar Series On Pascal

BEDFORD, Mass. — Digital Equipment Corp. has announced a series of seminars on "Pascal as a Second Language" for professional programmers.

No knowledge of Pascal is assumed but programming experience is a prerequisite, according to DEC's Educational Services Department.

The two-and-one-half-day seminar covers the reasons behind Pascal's development, and all elements of standard Pascal including data structures, control statements and program structure will be examined.

Seminar attendees will be expected to write program exercises to gain some understanding of Pascal's key features, DEC said.

The seminar costs $545 and will be run on the following 1981 schedule: Washington, D.C., Jan. 27-29; Los Angeles, Feb. 23-25; San Francisco, Feb. 25-27; Minneapolis, March 23-25; Dallas, March 25-27; Boston, April 27-29; New York, April 29-May 1; Atlanta, May 20-22.

Registration details are available from DEC at 29 Hudson Road, Sudbury, Mass. 01776.

Correction

NEW YORK — An announcement of the Yankee Group's Feb. 24-25 conference here should have listed the title as "The Refocusing of IBM Beyond the 3081."

Registration for the conference costs $725,

Inquiries should be sent to Marjorie Sugarman, P.O. Box 43, Harvard Square, Cambridge, Mass. 02138.

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Jan. 12-14, New York — **Auditing Teleprocessing Networks.** Contact: DP Auditors Association, Inc., G.P.O. Box 1279, New York, N.Y. 10001.

Jan. 13-14, Minneapolis/St. Paul — **Two Days to More Effective Writing.** Contact: Metropolitan College, St. Louis University, 221 N. Grand Blvd., St. Louis, Mo. 63103. Also being held Jan. 22-23 in Boston and Jan. 28-29 in St. Louis.

Jan. 29-30, Washington, D.C. — **Information and Telecommunications Services: Business Strategies for the '80s.** Contact: Executives Enterprises, Inc., 33 W. 60 St., New York, N.Y. 10023.

Feb. 1-4, New Orleans — **Bank Telecom '81 Workshop.** Contact: Ann Siegel, American Bankers Association, 1120 Connecticut Ave. N.W., Washington, D.C. 20036.

Feb. 1-5, Lake Buena Vista, Fla. — **Microdata's User Conference.** Contact: Microdata Corp., 4300-L Lincoln Ave. Rolling Meadows, Ill. 60008.

Feb. 1-6, Los Angeles — **Managing the Information Resource Program.** Contact: Patricia Carlson, Suite 2381 Graduate School of Management, University of California, Los Angeles, Calif. 90024.

Feb. 2-3, Cambridge, Mass. — **DP Fundamentals for Management and Users.** Contact: Harvard University, Laboratory for Computer Graphics, Cambridge, Mass. 02138.

Feb. 2-3, Houston — **How to Achieve the Cost Savings and Sales Benefits of Manufacturing Resource Planning.** Contact: Pam Richards, McGraw-Hill Seminar Center, 305 Madison Ave., New York, N.Y. 10017.

Feb. 2-3, Andover, Mass. — **How to Improve Your Productivity.** Contact: Education/Training Resource Center, New Hampshire College, 2500 N. River Road, Manchester, N.H. 03104.

Feb. 2-4, Palo Alto, Calif. — **Cryptography and Data Security.** Contact: Hellman & Associates, 299 S. California Ave. Palo Alto, Calif. 94306.

Feb. 2-4, Boston — **Advanced/On-Line Systems.** Contact: Management Advisory Publications, P.O. Box 151, Wellesley Hills, Mass. 02181.

Feb. 2-4, Washington, D.C. — **Peripheral Array Processors for Signal Processing and Simulation.** Contact: Continuing Education Institute, Suite 1030, 10889 Wilshire Blvd., Los Angeles, Calif. 90024.

Feb. 2-4, Washington, D.C. — **Computer Communication Systems and Networks.** Contact: The George Washington University, School of Engineering and Applied Science, Washington, D.C. 20052.

Feb. 2-4, Newport Beach, Calif. — **Computer Contracting — a Practical Guide.** Contact: International Computer Negotiations, Inc., 1331 Palmetto Ave., Winter Park, Fla. 32789.

Feb. 2-4, Madison, Wis. — **Microprocessor-Based Energy Management Systems.** Contact: Robert P. Madding, University of Wisconsin-Extension Engineering, 432 N. Lake St., Madison, Wis. 53706.

Feb. 2-4, New York — **Fundamentals of Finance and Accounting for the Nonfinancial Executive.** Contact: Wharton School, University of Pennsylvania, Philadelphia, Pa. 19104. Also being held Feb. 4-6 in Los Angeles and Houston and Feb. 9-11 in Miami.

Feb. 2-4, San Francisco — **The IBM 4300 Series.** Contact: Technology Transfer Institute, P.O. Box 49765, Los Angeles, Calif. 90049.

Feb. 2-6, Houston — **Data Base Modeling and Design Workshop.** Contact: Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036. Also being held Feb. 2-6 in San Francisco.

Feb. 3-4, Houston — **Microprocessors in Control Systems.** Contact: Instrument Society of America, P.O. Box 12277, Research Triangle Park, N.C. 27709.

Feb. 3-4, San Francisco — **Local Area Communications Networks.** Contact: McGraw-Hill Publications Co., Conference and Exposition Center, 1221 Ave. of the Americas, New York, N.Y. 10020.

Feb. 3-4, Houston — **Computer Process Control Strategies.** Contact: Instrument Society of America, P.O. Box 12277, Research Triangle Park, N.C. 27709.

Feb. 3-5, Philadelphia — **International Word Processing Symposium.** Contact: International Word Processing Association, 1015 N. York Road, Willow Grove, Pa. 19090.

Feb. 4-5, Washington, D.C. — **Computer Systems Risk Analysis.** Contact: CRC Systems, Inc. 4020 Williamsburg Court, Fairfax, Va. 22032.

Feb. 4-6, Chicago — **Product Evaluation and Planning.** Contact: Applied Management Institute, 555 E. Ocean Blvd., Long Beach, Calif. 90802.

Feb. 4-6, New York — **Data Processing: An Introduction to Concepts and Systems.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Feb. 4-6, Hartford, Conn. — **Computer Auditing and Security.** Contact: Don Florek, The Hartford Graduate Center, 275 Windsor St., Hartford, Conn. 06120.

Feb. 4-6, Washington, D.C. — **DP for Users: Managers and Professionals Who Depend Upon Computers.** Contact: Management Resources International, Inc., 6621 Electronic Drive, Springfield, Va. 22151.

Feb. 5-6, San Francisco — **Fundamentals of Management for New and Prospective Managers.** Contact: Wharton School, University of Pennsylvania, Philadelphia, Pa. 19104.

Feb. 5-6, New York — **Word Processing: Management Concepts, Organization and Guidelines for Implementation.** Contact: Harvard University, Laboratory for Computer Graphics, Cambridge, Mass. 02138.

Feb. 5-6, Boston — **Techniques for Automating Auditing.** Contact: Management Advisory Publications, P.O. Box 151, Wellesley Hills, Mass. 02181.

Feb. 8-11, Lake Buena Vista, Fla. — **SAS Users Group International Conference.** Contact: SAS Institute, Inc., P.O. Box 8000, SAS Circle, Cary, N.C. 27511.

Feb. 9-11, Orlando, Fla. — **Managing DP System Maintenance.** Contact: Management Advisory Publications, P.O. Box 151, Wellesley Hills, Mass. 02181.

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EDITORIAL

Heading Off Bell

Newly deregulated AT&T, the company richer than most nations, plans to test a home and business information system in Texas next year, but some of the state's newspaper publishers have formed a posse to head Bell off at the pass.

Earlier this year, the Federal Communications Commission (FCC) moved to give Bell freer rein to enter the data processing marketplace so long as the carrier's DP side stays financially separate from its voice side, where a herd of phone companies make many billions of dollars every year.

Led by Phillip J. Meek, president and editorial chairman of the *Fort Worth Star-Telegram* and chairman of the Texas Daily Newspaper Association's telecommunications task force [CW, Dec. 15], the publishers regard the test Bell plans for Austin in mid-1981 as an example of the "unfair advantage" they claim Bell will have in developing services directly competitive with newspapers [CW, Dec. 15].

At stake may be quite a chunk of the $14.5 billion those publishers reportedly drew in advertising revenues last year.

For Bell's part, a spokesman has said "we are not selling the service in the hope of putting a foot in the door and then saying it's already established. This is an experiment; there is no charge; we are not prohibited from doing an experiment."

The test will offer about 600 homes and 50 businesses in the Texas capital access to white pages and Yellow Pages telephone listings, the spokesman noted, as well as advertising by realtors, supermarkets, department stores and other businesses.

In a protest lodged with the Texas Public Utilities Commission (PUC) Meek and his colleagues are protesting the experiment on a procedural basis. "We think something of this nature should have a hearing as opposed to just getting filed and approved almost automatically," Meek stated.

Computerworld has learned that the PUC processed Southwestern Bell's application for the test without a public hearing and without referring the matter to the state commissioners. According to Meek, the riled newspaper publishers view Bell's apparent interest in offering computerized information services as violating the carrier's 1956 Consent Decree with the U.S. Justice Department. The decree was intended to keep Bell out of the DP corral.

Meanwhile, some Bell watchers are wondering whether the carrier will venture into the banking industry, which has developed services such as bill payment over phone lines with the home phone acting as a data terminal.

If Bell does want to enter publishing and banking, the matter warrants the attention of the public, legislators and the judiciary at the highest level.

Among the issues raised by this prospect are whether any single organization, especially a profit-making corporation, can dominate both the means of communication and information gathering normally available to an individual citizen.

DATA PAST

Five Years Ago
Dec. 31, 1975/Jan. 5, 1976

WASHINGTON, D.C. — IBM and its partners planned to provide domestic satellite services to users in 1979, according to a proposal filed with the Federal Communications Commission (FCC). IBM was one of the major partners in Satellite Business Systems, created to carry on earlier proposals made by CML Satellite Corp. The SBS application complied with the FCC restrictions set forth in early 1975 that gave IBM and Comsat General several alternative ways to enter the satellite business.

Eight Years Ago
Dec. 27, 1972/Jan. 3, 1973

NEW YORK — An internal memo stated that an "intensive investigation" of IBM's pricing policies "would reveal the extent of our price control and its supporting practices" in the computer market. "Such a revelation would not be helpful to our monopoly defense," the memo added. The document was uncovered from the almost 27 million documents filed in the various antitrust cases against the company. The first memo stated that the "liability of IBM's risk lease is dependent on price leadership and control."

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- AND AS LONG AS THEY DON'T PRINT ANY OF IT OUT, THEY'RE STILL AHEAD OF THE GAME!
JIM RYAN Computerworld

LETTERS

Inevitable Pathway

This is in reply to the Nov. 17 article on remarks by Charles D. Ferris, Federal Communications Commission chairman, who warned of privacy threats. He stated, "I would ask each of you to think of the privacy consequences, and to try to address them at an early stage. Design them away, program them away. Do your human engineering with this human interest goal in mind."

In my 15 years of systems work, I have found that you generally do what the boss asks of you or go your merry way. This thing is bigger that any programmer, analyst, project leader or manager. Have you ever noticed how a large computer system (and sometimes smaller ones) and city, county, state and federal governments act like a big machine that can be a help or a hindrance — can serve a good purpose or sometimes perform like a monster or beast that's gone out of control?

To say "Design them away, program them away," is amusing, if not just outright folly.

No one person or group can get us off that pathway that leads to control by the government through information about the people — even to the point of monitoring and controlling what we buy and sell.

James K. Carnine
Geneseo, Ill.

Golden Methodology

I found that the editorial on the subject of deskilling programmers created a very true impression of the status and problems surrounding structured methodology standards in data processing today [CW, Nov.10].

I have kept up with all previous editorials of structured programming methodology because I am a strong advocate of its implementation in data processing.

But there is a point I wish to make concerning the effect of structured methodology upon my early experience as a programmer.

During the formal data processing training I received, "structured methodology" was just a buzzword. Most information sources I consulted fell into one of the six categories stated for definition of structured methodology. Armed with this wealth of information, I was able to formulate a logical basis for the essential steps required to code programs that were easy to debug and clean running.

That progress was due to the proper direction of my efforts by the system programmer of the shop in which I started. This perspective at my early levels was fundamental in my progress as a beginning programmer.

And thus I come to my point. It is my opinion that if beginning or average-skilled programmers are given the proper instruction and direction in the early stages, their skills will develop in much the same manner as have mine.

In the sense of the text, structured methodology does deskill programming techniques used thus far in the history of programming, but for my experience as fairly well-skilled analyst who hates late-night telephone calls, structured methodology is worth twice its weight in gold.

Philip Shaner
Kansas City, Mo.

Antiquated JCLs

"IBMer Pans JCL" [CW, Oct. 13] stated that "IBM made a mistake when it created JCL . . . But not only IBM's JCL is behind the times . . . Every vendor's command language is antiquated."

I suggest that John McKeehan look at Burroughs Corp.'s command language. It' is nothing like JCL: it provides unstructured human qualities and it certainly is not antiquated.

Harvey Schoenman
Pittsburgh, Pa.

SOFTLINE/Werner L. Frank

The Transaction Processor

In a previous column we discussed the software environment in which application programs operate. A trace of history showed the evolution of that environment moving from simple hardware-based bootstraps of the early 1950s to the complex four-part systems of today, via the operating system, the input/output control mechanism, the teleprocessing (TP) monitor and the data base management system (DBMS). The new kid on the block, the data dictionary, is making its entrance at this time.

Users pay for these facilities in the form of hardware extensions, additional memory and storage resources and the execution of a good number of machine memory and I/O cycles. But in return, the same user achieves standardization and convenience, which should gain higher application software implementation productivity as well as improved maintainability of the operating programs.

To this structure now looms one more software addition in support of the on-line, terminal-oriented systems proliferating in today's world of lower cost screen devices and distributed processing. This increment to the software environment is the transaction processor.

As in the past, this software element is derived by peeling off certain functions which are already resident within one or more of the existing environmental modules and extending them. These existing facilities are collected together and, by adding new capabilities, are further generalized. Thus the transaction processor module will draw heavily from the TP monitor, have a strong link to the data dictionary, depend upon the I/O system and become somewhat competitive with the standard operating system.

New Emphasis

This transaction processor, however, brings with it a new emphasis and some new features. The software is both a framework for structuring the interactive application as well as the mechanism for executing the on-line dialogue in a video screen-driven setting.

Earlier systems focused on individual lines of input and lines of output. This one-dimensional view of computing life was conditioned by the line of code, the individual card image and the line of printer output. The view was heightened even further when computing went on-line because of the preponderance of terminal devices which were functioning on a line-at-a-time basis. This practice persisted even with the introduction of CRT screen devices which more often than not simulated a piece of paper, virtually rolling across the display surface.

But several observations were made. CRT displays are two-dimensional and can heighten the performance of the user if the full screen is used simultaneously. Furthermore, structure of the screen display can be abstracted and hence generalized for implementation purposes. Finally, the flow of program logic is dictated by the screen display and sequence as viewed by the user, rather than from an internal procedural structure which must ultimately be transformed to output on an external device.

The transaction processor, therefore, must have the following five components:

- Screen definition capability.
- Screen generator and screen library capability.
- Dialogue composer.
- Processing logic.
- Binder and execution module.

Recognition that screens have the possibility of an inherent structure was no doubt motivated by the same factors that led to the abstraction of an output page, which earlier had quite naturally led to the report generator. In the latter case, for example, the abstracted features of a report are the title, page number, date, control break, column headings, detail line items and summary controls, as well as physically related features concerned with the number of characters per line or number of lines per page. Once recognizing this commonality, the generalized report writer/composer was not far behind.

The screen abstractions are similarly derived. They can have unique names that are managed through a screen library system and can be addressed or called from other screens so that a dynamic dialogue of sequenced screens can be generated.

The screen layout is composed of three parts: the protected area and the unprotected areas making up the presentation portion, and the control area for guiding the user. The first part consists of the fixed and nonmodifiable information displayed on specified portions of the screen and protected from change by the user.

The second area is the location on the screen, which invites change through input of data or change of a setting under the control of a marker or cursor. The unprotected areas are often suitably displayed through various enhancing means such as underlines, reverse video bars or a number of special character symbols suggestive of solicited entry type and data structure.

It is also desirable to visibly show which unprotected input areas are mandatory input points and which are discretionary. Coupled with this feature is the optional presentation of default values directly into the unprotected fields. In this way the most likely to occur input is already present. Hence the actual user input, measured by keystroke, is minimized.

Graphics indication of permissible input form through Cobol "picture" notation or other prompting information, complete the architecture for the generalized screen presentation structure.

Control Function

However, a control function is still necessary. This is achieved by dedicating a third special area. Typically the first line or last line of the screen is often used to serve the dual function of providing prompts for alternative moves or actions based on the particular status of the screen information.

(Continued on Page 36)

HUMAN CONNECTION/Jack Stone

'Critical Elements' Key to Personnel Appraisal

As we look forward to another wild year for this industry, it seems appropriate to take stock of how you're handling the computer center employees — those vital, unsung heroes and heroines who are making the center the success (hopefully) that it is today. And perhaps the most significant aspect of your personnel management function is the performance appraisal system, the subject of this week's article.

All the employees want to know "where they stand" in the eyes of the management and what they have to do to improve; and if the employees are not getting this word on a regular basis, then the appraisal system is not doing the job.

The U.S. Office of Personnel Management (OPM) has done some crackerjack work in interpreting the intent of Congress in the Civil Services Reform Act of 1978, which includes the development of fairly specific procedures on how appraisals should be conducted. Here's the OPM approach to this challenge:

(1) The job must be carefully analyzed and the major elements of the job identified. To do this, a supervisor may have to access mission and functional statements, position descriptions, short- and long-range plans, budgets and project documentation.

(2) Then, "critical" elements are identified. These are job elements any one of which is so important that employee performance below the minimum acceptable standard requires remedial action, and may be the basis for reducing the grade level of the employee — or removing the person from the organization altogether.

Put into different words, a critical element is so important that failure to perform it satisfactorily would endanger the program or have other serious consequences. (Critical elements also include such disagreeable supervisory and managerial duties as recommending or making unfavorable personnel decisions, developing and counseling low performers and handling complaints regarding Equal Opportunity and Affirmative Action programs.)

Critical elements should include only those aspects of the work over which the employee has control. They should cover individual aspects of the employee's position, such as those relative to human resources management, work management, financial management and communications. They should also cover organizational aspects of the position, such as program planning and implementation.

How many elements are critical? OPM suggests eight or nine max — if the number is larger, then thought should be given to grouping them into broader categories. The number will also vary among positions and from year to year or more frequently.

(3) Next, performance standards are developed from the same sources used to develop critical elements. These standards should define performance in terms of *product* — what is to be accomplished, and *process* — how it is to be accomplished. These standards should be as specific and measurable as possible, and expressed in terms of quality, quantity, timeliness and cost.

The standards should be realistic in terms of what is achievable and yet challenging enough to stimulate employee growth. Realistic standards would take into account factors such as availability of resources, operating environment and uncontrollable factors which affect the individual's capacity to perform.

Because these factors may well change, the performance standards cannot be treated as immutable absolutes; clearly they must be reviewed regularly to assess validity under existing circumstances and revised promptly when necessary.

(4) A month before the appraisal period begins, the supervisor and the employee develop a written "performance plan." This document includes the critical and other performance elements which reflect the employee's significant duties and responsibilities, and the performance standards which will be used to evaluate the levels of accomplishment for these elements.

The performance plan should be evaluated in the light of the following: Appropriate critical elements are identified; the plan covers all significant duties and responsibilities; performance elements and standards are clearly and fully described; and achievements can be quantitatively measured.

If the supervisor and the employee disagree over the content of the performance plan, they should try to resolve them informally. However, the supervisor makes the final decision on the contents of the plan.

(5) Appraisals, supported by documentation, are to be conducted annually, with progress reviews as required. However, employees have the option to request a pre-appraisal meeting to present their own assessment of performance, inform the supervisor of special circumstances which may not be known, and identify objectives to be included in the performance plan for the next period.

I daresay that if DP departments followed appraisal guidelines similar to OPM's, we'd have much happier crews.

READER COMMENTARY/Omri Serlin

Application Generators High on Productivity

Re Werner L. Frank's article on application generators [CW, Oct. 27], Figure 1 shows how I view application generators in relation to such other closely related techniques as:

- Reusable code systems.
- Data base management systems (DBMS)/query languages.
- Packaged applications.

The diagram shows a three-dimensional space with Applicability, Data Base Orientation and Productivity Improvement as axes.

Application generators (which are often and erroneously called "nonprocedural languages" — I think "menu-driven systems" is a far better name that avoids confusion with nonprocedural languages such as Simscript) occupy the center stage in this space, between reusable code and application packages. Reusable code systems, in which an existing library of precoded complete modules or module skeletons can be recalled by KWIC searches, are high on applicability because they contain far less of the final structure of the application.

Application packages, on the other hand, are classified as having "narrow" applicability, because the structure of the application is already fully determined by the manufacturer, with relatively little room for tinkering.

In terms of productivity improvement — the ability to generate and maintain new applications at minimum cost and in a short period — reusable code is low on the scale, although it is certainly higher than conventional programming, even when high-level languages such as APL, PL/I, or Pascal are used.

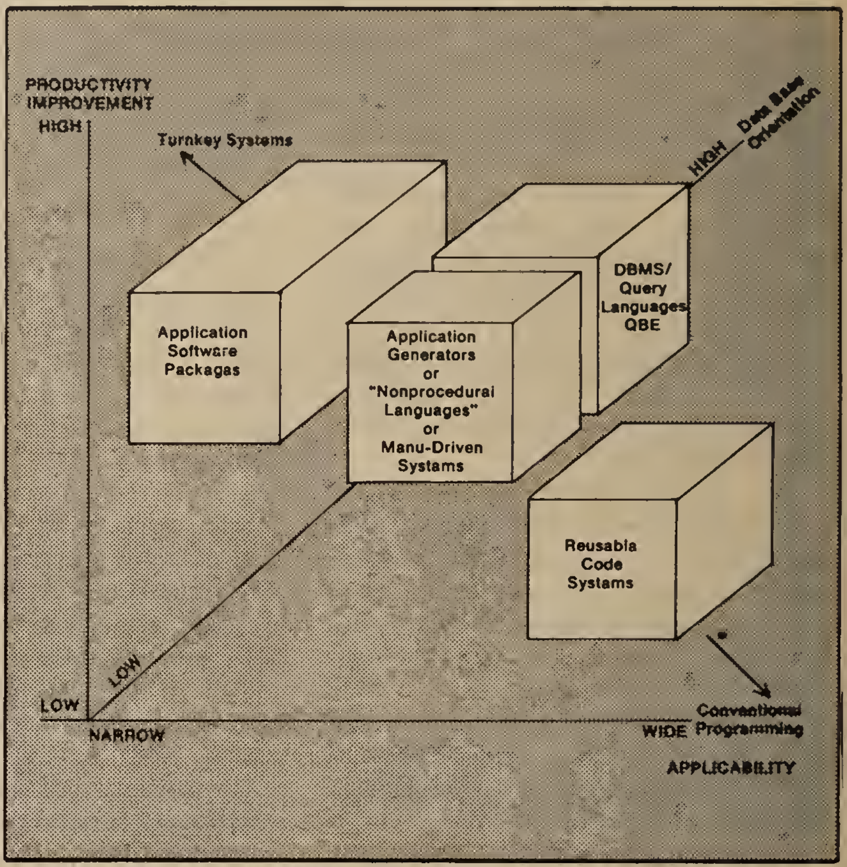
Application packages are very high on the productivity scale because they entail little effort to "produce," and their maintenance is standardized and generally supported by the manufacturer.

Inquiry languages that allow end users to quickly construct miniapplications against an existing data base, using the facilities of a DBMS, are probably halfway between reusable code and application generators in terms of applicability and productivity. However, they extend more into the dimension of data base dependency. Application generators, in practice, are also more data-base-dependent than either reusable code or packaged software.

There are far more application generators or menu-driven systems on the market today than the four that Frank cites (ADF, DMS, Generation 5 and Aims). I would add to the list:

- The Nocode system from General Automation, Inc.
- The Taps/TTP system, offered by Informatics, Inc.

Serlin is president of Itom International Co. in Los Altos, Calif.



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Transaction Processors

(Continued from Page 35)

This line is also used as the response location for error and remedial messages. Often this single line is augmented by special function keys physically available on the keyboard itself.

Given these screen composition rules it is possible to develop a screen definition and generation system inclusive of the following features:

- Naming the screen.
- "Painting" the screen on the physical CRT just as it would ultimately appear at use time.
- Specifing data entry or selection points including associated variable label, format, presentation attributes, default values, validation criteria and associated error messages.
- Compiling the screen and incorporating it in an accessible library.

Screen design and dialogue composition should not be arbitrary or random. At the very least, screens of one application should look like they belong together. Hence, a good screen generation and composing system will also enforce certain rules concerning screen structure and sequencing such as:

- Selection from a list is better than requiring entry of data.
- Names are better to deal with than numbers.
- Diagnostics should be self-explanatory.
- Entry points should be minimized.
- The system should be engineered for errors.
- The system should be easily forgiving.
- Redundancy of information is desirable.
- Alternative actions should be prevalent.
- Execution of a screen should be rapid.
- Successive screens should maintain consistency and a constant tempo.
- Screens should always lead to a goal and have no dead ends.
- Every action should be reversible.
- Tutorials should be strategically available.
- Structured sequences of screens should be amenable to short circuits for those who develop familiarity.

The dialogue composer is the piece of the transaction processor which causes screens to be laced together to form a specific application dialogue. In essence, the composer describes the hierarchy and the logic flow of moving from one screen to another.

Function Keys

The screens and associated interactive dialogue are further supported by the presence of the function keys. These function keys initiate general-purpose, application-independent facilities.

In addition, the function key will also be used to facilitate various exit options, during the course of executing the application, ranging from restarting input to the current screen, reinitiating the application, or aborting the present operation.

Which brings us to the binding and execution module.

We are now faced with an architectural question concerning implementation. Current systems go in two directions, procedural and nonprocedural.

The procedural approach ultimately leads to a standard, compiled program, typically Cobol, wherein "calls" or "includes" are stated which pick from the screen library the appropriate code or tables to generate the desired screens, and cause the entire application to execute. Here the control is under conventional program management (e.g., Cobol), and most of the transaction processor is really the screen definition and generator phase.

In the nonprocedural approach, control of flow is dictated by the logic and structure of the screen sequencing as defined by the dialogue composer. Processing is incidental to the screen, either through an external call or directly as part of the screen handling itself, as defined in the processing logic module. The actual execution of the application is then carried out by the execution module of the transaction processor subsystem.

In many older systems, especially for mainframes, transaction processors are not yet part of the basic software environment. Rather, there are special implementation tools such as the Development Management System offered by IBM and commercially available products like ACT I and Taps.

However, on many newly offered systems, and especially in the low-end scale of computer lines, the transaction processor is already a vital part of the basic software environment. This will also become the case for newly emerging mainframe computers in the 1980s.

READER COMMENTARY/Paul J. Wilczynski

How Important Is Experience?

The need for programmers is often not met at the same time that thousands of programmers are readily available because of what I believe are unrealistic and unnecessary requirements set by data processing managers and supervisors.

The requirements I have in mind have generally to do with the number of years of experience in data processing a prospective employee must have. Most often, the golden number is two — without the magic two years, a well-qualified and well-trained individual often is dismissed out of hand.

Admittedly, some positions require a high level of experience. Would you, for example, hire a freshly trained Cobol programmer as your senior systems programmer? Obviously not. But how many of the technical positions in your organization are actually at this level?

Drills or Holes?

Often the problem is that managers misunderstand the relationship between the results they want and the actual abilities needed to achieve those results. It is frequently said that people don't buy drills because they want drills; they buy drills because they want holes. So too, a manager should be looking more for ability and potential than for raw years.

Why, for example, in an IBM shop is an applications programmer with IBM experience almost invariably given preference over a person with, say, a Honeywell, Inc. background? Honeywell Cobol is not *that* different from IBM Cobol and our hypothetical Honeywell programmer may have abilities that outweigh those of the IBM applicant.

The technical difference between the two is probably more in terms of JCL and operating systems, and a good programmer should be able to adapt readily to a new environment.

The key point to consider here is motivation and ability to learn. Many individuals have succeeded in apparently Herculean tasks, or have broken through apparently insurmountable obstacles, not by virtue of what they already knew, but rather through their own desire and willingness to accomplish.

I would urge the data processing manager to take another look at new staffing requirements.

Ask yourself some serious questions. Given today's rapid escalation of programmer salaries, is there a possibility that the return on investment for a person with less experience might be significantly better than that for the more highly experienced individual? I think you'll be surprised.

Wilczynski is vice-president, internal operations, for Cyberned Corp., Framingham, Mass.

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To: Beth and John.

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Bob

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COMMENTARY/Marguerite Zientara

The Thrill Is Gone

The thrill is gone from the American electorate's courting of a president. After long months of campaigning — during which time it was anybody's guess who would be the next U.S. president — the Nov. 4 computerized vote tally brought a quick end to this year's uncertainties.

Long before the polls had even closed in California, Oregon, Washington, Alaska and Hawaii, President Jimmy Carter had made his televised concession speech to the nation.

And, thanks to the magic of computer-aided projections based on models of "key precincts," both radio and television had told Westerners two hours before the concession — and with only 1% of the vote actually counted — that, essentially, the race was all over.

This frenzied use of computers can certainly be seen as irresponsible, being another of the many examples of man using computers simply because he *can*, not because he *must*.

Days Gone By

Editorial pages East and West have since carried fond recollections of the era when citizens excitedly stayed awake past midnight to hear the final outcomes of presidential contests.

Those days are gone. This year, in fact, no sooner had an Easterner settled into his easy chair for an evening of statistics and analysis than our president was telling him how much it hurt to lose the election.

But Jimmy was not the only American hurt in that election — millions of listeners on the West Coast, perhaps just preparing to venture out to the polls, undoubtedly felt a similar twinge of rejection on hearing the race was over before it even began. The message was clear enough: Their votes just did not matter.

Why does anyone need to know the projected outcome of a presidential election at 8:15 p.m. EST — the moment NBC News made its daring prediction last Nov. 4? The answer is: Nobody does.

The race to call the winner has evolved into a network free-for-all, without regard for the portion of the electorate that it disenfranchises. Besides being a function of the natural competition among the three major television networks, such rivalry also boils down to their courting of advertisers for future election coverage — both completely self-serving motivations.

Besides an informal plan prohibiting the counting of votes until Wednesday morning following the election, or another that would close all polls at the same time (5:00 Eastern, 6:00 Central, 7:00 Mountain and 8:00 Pacific Time), a possible solution lies in a bit of legislation introduced a week after the election by Sen. James A. McClure (R-Idaho).

McClure's bill would prohibit the broadcasting of presidential election returns until the polls have closed in all parts of the country, a plan that has recently been suggested in countless letters to the editors of newspapers around the country.

A similar law exists in Canada, which tackled the problem 45 years ago when the Liberal Party made such a sweep of the eastern provinces in the 1935 election that the Conservatives conceded while people were still voting in British Columbia.

After studying the problem and several possible solutions, in 1938 Canada added to its election code the provision that no one may publish in any province where the polls are still open the results, or purported results, of voting that has already taken place anywhere in the country.

Zientara is a CW writer/analyst.

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S-1 Controlling Network Costs **Harry Newton**, Pres., Telecom Library

S-2 Investing in The Telecom Industry **Neil H. Brownstein**

A-1 Keynote Telecommunications 1980-1990 **A. Krowe** IBM Syst Comma Div., **R. LoBlanc**, Continental Tel Co.

A-2 Comparing Data Network Architectures - Vendors & Discussant (Louis Pouzin) **Dr. Dixon R. Doll**, Pres DMW Group

A-3 Legislation and Policy Framework for Telecommunications in the 1980's **Richard E. Wiley** Kirkland & Ellis Conference General Chairman

A-4 Impact of Microelectronic Technology on Telecommunication Systems **Edgar A. Grabhorn**, Senior Consultant, Arthur D. Little, Inc.

A-5 Restructuring the Telecom Marketplace: Business Impact of Carrier Unregulated Subsidiaries **Howard Anderson**, Pres The Yankee Group

12:15 - 1:45 — **FEATURED LUNCHEON SPEAKER** (For all Conference Registrants) Dr. C. Jackson Grayson, Jr. President, American Productivity Center, Haustan

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B-1 Local Network Architectures **Dr. Ira Cotton**, Booz, Allen & Hamilton

B-2 Electronic Mail and Message Systems Options **Walter Ulrich** Consultant

B-3 Computer Communications Inquiry—II **Ellen Deutsch**, Nat'l Telecom. & Info. Admin.

B-4 New Options in the Switched Voice Market **Janice Drummond** Managing Ed., TELEPHONY Magazine

B-5 Network Standards and Protocols **Gary Audin**, Pres., Delphi Inc.

B-6 Technical Control Centers Design, Perform Parameters, Software and Implementation **Richard L. Deal**

B-7 "Viewdata" Services Novelty or Necessity? **Haines Gafner** Pres., LINK

B-8 Electronic Mail: What's the Franchise to USPS & Public EM/MS Networks? **C. Joyce** V.P., R.L. Deal Assoc

B-9 Policy and Industry of Implications of "Carrier Competitive" Subs **Dale Hatfield**, NTIA

B-10 Managing Your Own Career in Telecom **E. Murphy** E.F. Murphy Assoc., **H. Lavitt** Comm Sciences

B-11 New Developments In Intelligent PBXs **James Gordon**, Pres. TCS Communications Consultants

B-12 Information Appliances Friendly Terminals for Personal & Business Use **Dr. D. Carter** Texas Inst DSD

2:45-6:00 — **NASA TOUR**
5:00-6:30 — **PRESS, SPEAKER AND VIP RECEPTION** (Exhibit Hall: By invitation Only)
6:00-8:30 — **RECEPTION AND DINNER:** San Jacinta Inn (Dutch Treat) far NASA Trip Attendees

F-1 Future of the Bell System Town Meeting Panel on Bell Unregulated Subsidiaries **Richard E. Wiley** Chairman

Conference Program Wednesday, January 14, 1981

DESIGNING NETWORKS FOR MULTINATIONAL ENTERPRISES

7 30 · 8:00 · 8 30 · 9:00 · 9 30 · 10:00 · 10:30 · 11.00 · 11 30 · 12 00 · 12 30 · 1 00 · 1 30 · 2 00 · 2 30 · 3 00 · 3 30 · 4 00 · 4 30 · 5 00 · 5 30 · 6 00 · 6 30 · 7 00 · 7 30 · 8 00 · 8 30 · 9 00

S-4 Mixed Vendor Network Management—Who Needs It?

S-5 Sharing Interconnect & Long Dis Lines for Profit **Harry Newton**, Telecom Library

C-1 Keynote Planning Networks for Future Organization Structures **J. Hall**, GT&E Service Corp

C-2 Route & Service Selection & Tariff Analysis Technique **Jacqueline Shrago**, V.P., Telco Research Corp

C-3 Facsimile in the Corporate Network **David Mack**, Dir Lio Svcs, The Yankee Group

C-4 Office Automation A Stand Alone or Network Application? **Thomas A. Hannigan**, Pres T.A. Hannigan Assoc

C-5 Public vs Private Networks SNA vs. X25. Design Methods, Trends & Tradeoffs **Dr. Dixon R. Doll**, Pres DMW Assoc

C-6 Network Architecture—Voice Viewpoint **Dr. James E. Jewett** Pres Telca Research Corp

C-7 Transaction Communication Issues Policy Regulatory & Privacy Problems **John Mateiski** National Telecommunications & Information Admin

LUNCH —Facilities Available in the Exhibit Hall

S-3 Surviving the Management Fight in Comma., EDP, and Office Systems **Harry Newton** Telecom Library

D-1 Integrating Voice & Data on Digital Networks **Dr. Ivan Frisch** Sr V.P Network Analysis Corp

D-2 Satellite Availability **Dr. Jerome Lucas** Pres Telestrategies

D-3 Update on Public Data Nets Worldwide **Louis Pouzin**

D-4 Optical Networks **Jack Cook**, Head, Light Wave Appl Bell Labs

D-5 Selecting Front End & Communication Processors **John King** Pres 3K Group

D-6 The Intelligent Printer for Message & Office Systems **Jerry Eisen** Office Sciences International

D-7 Building Viewdata Networks for Home Information Distribution **John Bartlett** Kirkland & Ellis

D-8 Database Management in a Network Environment **Dr. Robert H. Holland** Pres Database Design

D-9 Off Network Communication: Products & Trends **David A. Post** Pres Page America

D-10 Planning Multinational Networks **Rui A. Lopes** Pres. R.A. Lopes Assoc

D-11 Latin America—Telecom Regulatory Problems **Dr. Alan Pearce** Consultant

D-12 Network Modeling Techniques **Linda A. Holbrook** Mgr., Network Analysis, GTE Svc

5:00 - 7:00 — **MEXICAN FIESTA** — Exhibit Hall

F-4 Future of Satellite Networks **Ronald A. Frank** Chairman **Dr. J. Lucas** Telestrategies **Terry Mahn** Wewer & Mahn **Dale Mullen** Johns Mansville

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LETTERS

'Failed' Software

Computerworld would be much improved if it stopped straining to put an anti-IBM slant on news. I refer to the article in the Sept. 29 issue, "Failure of IBM Packages Viewed a Boost to Industry."

John Imlay, a software executive, was quoted as saying, "The failure of IBM software packages like IMS has helped give the software industry a needed push." No explanation was given of why he judged IMS to have "failed" (The many installations using it? The commitment those installations feel to it?). No other packages were mentioned as examples of failures. The word "failure" makes a good lead, but is artificial when it has nothing to do with the thrust of the story and isn't supported by any facts.

Later in the article, Imlay drew the conclusion that after the U.S. vs. IBM case is settled, IBM will continue to be a dominating force in the industry. This is all the more impressive, considering that it is accomplished with "failed" software packages.

Gabriel Golberg
McLean, Va.

Poor Taste

Regarding the advertisement by Innovative Electronics, Inc.: Certainly a publication of *Computerworld*'s caliber could enforce better taste in advertisements.

All the articles in the world on professionalism and advancement based upon merit are discounted by sexist advertisements.

If you aren't publishing *Procurementworld*, maintain and/or return to your previous level of information and professionalism.

Norma Horton
Lewisville, Texas

Blatant Sexism

I am writing to complain about the blatantly sexist advertisement by Innovative Electronics, Inc. on Page 23 of the Oct. 27 issue.

What a woman in shorts and a tight T-shirt has to do with a peripheral is beyond me.

Why not a picture of a handsome man in a skimpy bathing suit with his hand draped over a CRT in a sexy pose? It would be about as sensible.

Men no longer have the monopoly on the purse strings in business. So clean up your act.

Or keep your ads in the National Rifle Association magazine, since that is the magazine your Madison Avenue people are catering to.

On behalf of all readers, especially the female ones, I feel you owe us an apology.

M. Bernstein
Address Withheld by Request

George Wallace Attitude

Catching up on some reading, I was amused by the article decrying that programmers were unwilling to train themselves at their own expense [CW, Oct. 20]. Two experiences of mine might be of interest:

(1). While working at a rather large DP installation, I was attending school to improve my DP skills. Without my permission, top management responded to this by calling the school and asking the school to drop me as a student.

(2). While working as a contract programmer in western Michigan, I was attending school. My employer decided to transfer me out of the area without consideration to my schooling and in spite of the fact that there was work to justify my presence in western Michigan until the completion of my schooling. Only through the intervention of the client was I able to complete my schooling.

I would like to conclude with a comment about DP management in general. Most DP managers have what I refer to as the "George-Wallace-standing-at-the-school-door" attitude toward their employees. That is, "I didn't attend. Why should they?"

Robert Sobey
Detroit, Mich.

Computerworld welcomes comments from its readers. Letters should be addressed to Editor, *Computerworld*, 375 Cochituate Road, Rt. 30, Framingham, Mass. 01701.

experts in Houston on January 12th!

Conference Program — Thursday, January 15, 1981

IMPLEMENTING NEW TELECOMMUNICATIONS APPLICATIONS

8:00–8:30
S-6 How to Identify High Payoff Network Applications — **Frank K. Griesinger**
S-7 Teleconferencing as a Profit Center — **Ron Frank**

9:00–9:30
E-1 Keynote Telecommunications as a Management Resource — **Dr. Howard Frank**
E-2 Management use of Toll Accounting Systems — **Frank K. Griesinger, Edward T. Whitney** Warner Whitney Corp
E-3 Voice Mail/Speech Processing Applications — **Thomas A. Hannigan** Pres. T.A. Hannigan Assoc.

10:30–12:00
E-4 Local Network Implementation — **Dr. Leonard Kleinrock**, UCLA
E-5 Integrating Distributed Data Processing into Corporate Telecom — **James Wetterou**, Mgr Sys Dev & Mgmt., Network Analysis Corp.
E-6 Meeting the Need for Qualified Telecom Personnel — **Larry Grodman**, Pres., QED Information Sciences
E-7 Protecting Network Data & Voice Transmission — **Helen Wood**, National Bureau of Standards

12:30 LUNCH — Facilities Available in the Exhibit Hall

1:00–2:00
S-8 Sandwich Workshop: Voice Comm. Mgmt. for DP Users — **James R. Schneider, Jr.**, Schneider Assoc.

2:30–3:00
G-1 Local Network Compatibility — **Ken Thurber**, Sperry Univac
G-2 How Will "Bell Unregulated Subsidiaries" Impact Users?
G-3 Large Switches for User Private Network Switching Systems — **Ashok K. Dhowan**, TranTelecom
G-4 Sharing Networks — Trends and Economics — **Nelson Hanover**, Pres. Telemation Mgmt. Group
G-5 Implementing PABX Systems — **Fred Chanowski**, Pres., Telecommunications Mgmt. Corp
G-6 Regulatory Problems in the Southwest — **Bill Bryce** Bryce & Barron

3:30–4:30
G-7 Manufacturing (High Technology)
G-8 Petrochemicals (Process Industry)
G-9 Medical/Research
G-10 Product Distribution
G-11 Insurance/Group Record Transactions
G-12 Transportation Services
G-13 Financial Services
G-14 Professional Services

5:00–6:30
F-5 Telecommunication Opportunities in the SW — **William Warner** Pres., Warner-Whitney Group, Houston; **Ray Besing** Besing & Armstrong

OVER SEVENTY SESSIONS AND PANELS!

SPECIAL PRECONFERENCE "IN-DEPTH" SEMINARS — Monday, January 12, 1981

OPTIONAL SEMINAR AGENDA (Separate Registration Required)

9:00-5:00 **IN-DEPTH FULL DAY COURSES (CHOOSE ONE)**
- Network Design Tools & Methods (W. Chou)
- Standards and Protocol Update (G. Audin)
- Business Opportunities in Viewdata-Type Markets (L. Greenhouse)
- Distributed Processing Systems (I. Cotton)
- Network Technical Control (G. Ryan)
- How to Get Your Company Into Print: Marketing Communications for Telecom Vendors (R. Frank)
- Key Topics in Network Technology in the 1980's, including PABX, Super Controllers, Large/Small Switches, Speech Recognition/Simulation and Fiber Optics in Telecommunications (R. Deol and R. Berglund, Systems Tech Forum)
- Limited Distance Networks (K. Thurber) **(Friday, Jan. 16)**

1:30-5:00 **IN-DEPTH ½ DAY COURSE**
- Telecom Careers 1980-1990 (H. Newton)

5:00 **SEMINAR ATTENDEE RECEPTION**

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LETTERS

Accurate Acronyms?

I can detect no rhyme or reason to *Computerworld's* capitalization and noncapitalization of acronyms.

Many acronyms are, I believe, correctly capitalized. Among these are CW, DP, CRT, IBM, TI, DEC and DBMS.

There are a group of acronyms for which I do not know the correct capitalization. Some examples (using the CW capitalization) are Stardis, Globcom, Ascii, Dox, Epat, COBOL, Cobol, FORTRAN, Fortran and Fasttp.

Last, there is a group which I am all but positive are capitalized incorrectly by CW. Some examples are (again using the CW capitalization) Ecom, Isam, Ansi, Darts, Cope, Dema and Adds.

This letter is not meant as a criticism of the technical clarity of CW articles. However, I believe CW is capitalizing many acronyms incorrectly. It would contribute to your professionalism if you could get your act in order.

Bryan T. Lifsey
Simsbury, Conn.

CW uses all capital letters for two- or three-letter acronyms and uses only an initial capital for acronyms of four letters or more that can be pronounced as "words." — Ed.

Lumpy Modules

I see that Ansi X3J3 wants to introduce still another definition of "module" with its "core-plus-modules" description of the next Fortran standard ["Ansi X3J3 Putting Fortran on a Diet," CW, Nov. 17].

Since the diagram seems to be a central blob with little lumps attached to it, perhaps X3J3 should call them "nodules" instead.

Michael D. Shapiro
San Diego, Calif.

Off Track

I found the two Sept. 29 front-page articles on presentations by Robert Price (CDC) and Larry Welke (ICP) interesting and related, but off track.

All our computer enthusiasts seem to forget that all organizations have had some form of management information systems (MIS) with which to make decisions centuries before Babbage was even born. Computers are only a modern means to a very, very old need. Compared with the pre-Babbage MIS, the modern computer can get more managements into trouble faster when the "homework" is inadequate and it is fed incorrect "information" resulting from inadequate homework.

I concur with Price that a contributing cause to our productivity crisis is the misdirected focus of top management. True problem solving is not a technical undertaking; it is a human or behavioral undertaking. The technical aspects are always a snap relative to what we might loosely call the behavioral aspects because you don't really get on to the technical aspects until all the behavioral aspects are adequately satisfied. As Peter Drucker so aptly put it, we don't start problem solving or decision making with facts; we always start with human opinions. Once the behavioral aspects are satisfied, problem solving is downhill from there on.

Productivity improvement is stupidly simple provided top management is able to change its attitudes and vested interests. I have yet to find any organization that does not have all the talent needed in-house or people raring to go IF AND WHEN top management will turn them loose. The unused ingenuity and innovativeness is staggering when you purposely look for it.

I must disagree with Welke because computers and communication technology do not change the fundamental process of problem solving, nor the basic nature of a bona fide problem correctly diagnosed and stated. Mother Nature has never bought our expedient explanations and rationalizations. Our modern gimmickry can either assist or handicap basic problem-solving processes.

Warren Eberspacner
Durango, Colo.

Untapped Resource

Once again articles in *Computerworld* repeat the often-heard cry that there is a shortage of DP personnel.

The question arises as to whether employers are seriously considering applicants more than 40 years of age or shutting the doors on them because of thread-bare cliches that have been disproved so many times, it is a wonder DP and personnel managers still believe in them. By refusing to consider older applicants, management is depriving itself of a wealth of experience that no college degrees, not even those from Harvard, Yale, Princeton or Stanford, could ever impart.

Isn't it time now, perhaps as a New Year's resolution, to begin to treat these applicants justly and without blinders?

John Callahan
Terre Haute, Ind.

'That Mini Sure Made This Job Easier, Boss!'

Applications Packages: A direct route to successful systems.

Read all about them in our January 26th Special Report.

Applications software is the most exciting and dynamic branch of the independent packaged software field. According to International Data Corporation, by 1984, applications software will account for 55% of the entire independent packaged software market. This means revenues will have nearly tripled and the opportunities for future growth are unlimited. Packaged software, because of its tremendous flexibility and diversity, is gaining rapid acceptance from users and they are demanding newer and more sophisticated solutions to their DP problems.

Our January 26th Special Report, *Applications Packages* will tell you the many ways users are putting these software packages to work for them. Edited by Rita Shoor, *Applications Packages* will take a look at the increasing technological (and financial) feasibility of these new packages, and why they've become so attractive to users. Featuring tutorials and articles from consultants who specialize in software selection, you'll read about:

- Software evaluation—choosing the right package for the right system.
- Cutting the costs of software maintenance.
- Interfacing the application package with the data base management system.
- The technology behind portable packages.

If you're an MIS Executive, DP Manager, Project Leader or Lead Programmer, you'll want to read our January 26th Special Report. And if you market programming products or services, you'll want your ad in this issue. Ad closing date is January 9th, and your *Computerworld* representative can give you all the details. Or, to reserve space for your ad, call Frank Collins at (617) 879-0700.

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What About the DP Manager? — Part 1

Data Base Technology Forgets Managers

By Ron Ross
Special to CW

Much has been written about solving the technical problems tied to data base design and implementation. But what about the DP manager who has to bring the technicians, end users and technology together if the data base project is to be successful?

The DP manager is the forgotten man in the literature of data base. Vendors constantly claim that DBMS packages eliminate many of the traditional problems in system development and support — poor designs, maintenance tangles and operational bottlenecks — but never quite get around to letting the DP manager know just how these worthwhile objectives are to be achieved. The implication is that data base does those things itself, as if by magic.

This idea is nonsense, and the perceptive DP manager instinctively knows it. The more he watches the data base drama unfold at his company, the more he begins to suspect the truth. The fact is that data base technology does not offer him tools to *manage* his data base system projects, particularly in the critical preimplementation design and analysis phases.

As a result, the DP manager has no alternative but to stumble more or less blindly down the road to data base development, with setbacks virtually every step of the way.

Voices over the past few years have called for data base administrators (DBA) to bring centralized control over data base definitions; for data dictionaries, to manage the definitions and documentation of implemented systems; and for programmer training, query languages and application program generators to improve productivity in creating applications.

Each of these solutions has been badly needed and is usually helpful when implemented. Assistance to the DP manager, however, has been indirect at best.

The unique situations that arise when DP manager faces data base management system (DBMS) are isolated in Part 1 of this two-part series. Part 2 will explore some suggested solutions to these problems.

The problem lies with the scope of these solutions. Not one addresses the preimplementation phases of data base system development — the *design* stages when crucial decisions are made.

For example, the question of which corporate areas are to be supported by the future data base system is unresolved, as is the identification detailed requirements that the system must satisfy. And what about a design blueprint for the overall architecture of the data base system?

Since these solutions concentrate on the implementation and postimplementation phases of the data base system project, they tend to improve technical tactics, while leaving the more important question of strategic planning unresolved.

Planning Tools Needed

The DP manager and the DBA need tools directed towards the preimplementation, planning and design stages of the project in order to control the data base system development.

The stages must be organized with appropriate conventions and standards and continuity between them must be ensured. The manager needs devices to improve the productivity of limited staff resources and to ensure that acceptable standards of quality and control are continuously met.

(Continued on Page 44)

'Crystal' Clarifies, Predicts Software Performance Problems

BOSTON — BGS Systems, Inc. introduced a performance evaluation software package at the recent annual meeting of the Computer Measurement Group here.

The Crystal interactive package accepts a system description that could include hardware, file structure, work load and software structure.

This input is then evaluated in terms of response time and throughput levels and a determination is made of where system resources are being consumed, according to BGS.

The system was designed to provide "a structured approach to predicting performance of proposed and partially implemented systems in a way that gives managers early warning of upcoming performance problems," claimed BGS President Harold Schwenk Jr.

It also helps technical personnel to assess the effect of alternative designs and to evaluate trade-offs, he said.

'Successive Refinement Fashion'

Crystal is typically utilized in what BGS calls "successive refinement fashion." Although the information available during the early design phase is limited, the product allows for an initial estimate of performance and resource consumption.

As the development cycle proceeds and implementation decisions become firm, the model reflects a successively more detailed and accurate description of system performance, BGS said.

Designed to interface with Best/1, BGS' performance modeling package, Crystal is said to generate more than 20 reports that include a graphics response time report, histograms of individual module CPU and I/O consumption and a module status report. Other features include a feasibility testing system that allows the user to study the effects of varying design parameters and the facility to graph the performance results, the vendor said.

Available Feb. 1, Crystal is priced at $17,600 from BGS at 470 Totten Pond Road, Waltham, Mass. 02254.

'Spotlight' Focuses On HP 3000 Users

MOUNTAIN VIEW, Calif. — Insight is offering a package that reportedly improves system management and reliability on Hewlett-Packard Co. HP 3000 systems.

Spotlight can be applied to any software product or service including contracted software services, the vendor said. The package is written in Cobol and runs under the Image data base.

Spotlight costs $10,000, or $500/mo, Insight said from Suite 2, 210 Easy St., Mountain View, Calif. 94043.

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LMI to Market Artificial Intelligence Systems

LOS ANGELES — A hardware and software system built specifically for artificial intelligence will be commercially available this month.

The Massachusetts Institute of Technology, which previously built these Lisp machines, has licensed a California-based company, LMI Corp., to manufacture them for the commercial market. A principal in LMI, Richard Greenblatt, was chief research scientist at MIT and has supervised the design and construction of Lisp.

The Cadr Model A utilizes the Lisp programming and running language, which has evolved from early forms developed at MIT in the early 1960s. Until recently, artificial intelligence has been devoted primarily to research, and the artificial intelligence found conventional machines to be inadequate for running Lisp efficiently.

LMI already has orders for their Lisp machine from Control Data Corp. and Texas Instruments, Inc. The price for the basic system will be $80,000.

More information is available from Steve Wyle at LMI, 163 N. Mansfield Ave., Los Angeles, Calif. 90036.

Technology Leaves Out DP Manager

(Continued from Page 43)

The manager also must promote end-user participation in the project and ensure that user requirements are effectively and accurately captured.

Finally, since data base technology utilizes methods that differ from traditional technologies, the DP manager needs strategic tools oriented to that specific methodology.

This last point deserves closer attention. Data base systems actually aggravate certain problems that come up during system development. This occurs for the following reasons:

- Data base system projects are larger than traditional projects and involve more people over greater periods of time. This makes long-term coordination and cooperation more difficult.
- The personnel who gather and analyze logical data base requirements are often lacking in expertise and training. The DP manager must marshall scarce staff resources, with varying experience and competence levels, to meet his objectives.
- Unlike application-oriented systems, data base projects are not easily planned, scoped and phased. Planning units for strategic data resource development do not come in application-oriented packages, but must be "discovered" through careful analysis of commonality in data usage and corporate functions.
- Since data base systems are oriented toward on-line concepts, design criteria must balance data center specifications against process center specifications.
- Data base methods usually require substantial end-user participation during the development process. It is the manager's responsibility to promote nontechnical communication between end users and the DP staff.
- Conventional data base wisdom says that DBMS-oriented design decisions should be postponed as long as possible. This ensures that the data resource itself has been accurately defined and reduces the chance that inconsistencies and redundancies will harm future data base performances.
- Data base systems require active participation from diverse groups, and everyone must have ready access to a central body of design information reflecting the current status and progress of the project. How is such a body of information to be supported? This question will be tackled next week.

Ross is the editor of Performance Development Corp.'s Data Base Newsletter. *He has recently written a book on data administration and data dictionary systems that is scheduled for release by Amacom, the publishing arm of the American Management Association.*

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DG Provides MP/Basic For Micronova, Nova 4

WESTBORO, Mass. — Data General Corp. has announced an MP/Basic programming language for its Micronova and Nova 4 systems.

Included in MP/Basic are extensions to the Ansi specifications to make the language applicable for technical, scientific and educational fields, the vendor said.

String Variables

Enhancements include string variables of any length, string concentration, substrings and letter-digit array names, the vendor said.

The initial license fee for MP/Basic for the DG MP/OS operating system is $1,000, with a $400 fee for subsequent CPUs.

For the AOS operating system, the fee is $2,000 and the subsequent CPU charge is $800, the vendor said from Rt. 9, Westboro, Mass.

'Mega' Runs on System/34

E. LANSING, Mich. — A financial planning package for IBM's System/34 minicomputer is available from Standard Research, Inc.

The package, called Mega, is a high-level support system that features net present value, benefit/cost ratio, internal rate of return and what-if analysis, the vendor said.

Typical applications include budget planning, market analysis, sales forecasting and corporate financing, a spokesman said.

The package costs $5,000.

Standard Research may be contacted through P.O. Box 151, E. Lansing, Mich. 48823.

Boole & Babbage Enters Capacity Planning Market

SUNNYVALE, Calif. — Boole & Babbage, Inc. has announced two software products and its entry into the capacity planning and forecasting market.

Questor, a performance prediction software product, was designed as a model building and simulation system of the total DP environment. It will cost less than $30,000 and be available in the second quarter of next year, according to a company spokesman. The company is selling the product under the terms of an agreement made with Performance Systems, Inc.

VAM/SPF is a productivity enhancement tool that reportedly allows IBM SPF program products to run independent of TSO. It costs $25,000.

The firm's entry into the capacity planning and forecasting software products market will be marked by products designed to solve a range of planning problems by providing data oriented more to the DP manager than to technically oriented system programmers, a spokesman said.

Boole & Babbage is located at 510 Oakmead Parkway, Sunnyvale, Calif. 94086.

'EP/3000' Aimed At HP 3000 User

GREENVILLE, S.C. — A job-cost-oriented manufacturing system for Hewlett-Packard Co. 3000 computers has been announced by Engineered Products.

The EP/3000 provides "complete data processing" from quotation through billing, including general ledger accounting, and reportedly gives on-line processing in manufacturing, control/shop reporting, inventory control, and bill of materials/shop orders, according to a spokesman.

Also covered are project estimating and job cost, raw materials distribution and general ledger and financial systems. The firm's software utilizes the HP Image data base management system, View/3000 terminal control program and the Cobol II programming language.

Base price for the usually customized package is $40,000. The firm can be reached through P.O. Box 6767, Greenville, S.C. 29606.

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Payroll Update Aids DEC Users

EVANSVILLE, Ind. — Evansville Data Processing Corp. (EDPC) has enhanced its payroll systems for users of Digital Equipment Corp. computers.

Available in Dibol for CTS-300 and CTS-500 users, the distribution package includes the "one-shot" program to change the data files into the format needed for the new release, a company spokesman said.

New features include the ability to run the system from either a scope or printing terminal, two security items and maintenance programs.

The enhancements package costs $1,500 plus media from EDPC at 1010 S. Weinbach Ave., Evansville, Ind. 47714.

HP Desktops Get Security

MT. HOLLY, N.J. — Structured Software Systems, Inc. has announced a program security system that reportedly improves the security on Hewlett-Packard Co. 9845B/C and 9835 desktops.

The package is said to prevent unauthorized access to software and proprietary algorithms and to prevent duplication of program media.

The security package consists of two programs: Oemsec, which enciphers stored programs, and Nodup, which prevents duplication of programs. The packages cost $2,500 each or $4,000 for both, the vendor said from 1072 Irick Road, Mt. Holly, N.J. 08060.

Transaction Manager Targets Small, Medium-Sized Banks

GRAND RAPIDS, Mich. — A Bank Information Management System designed for small to medium-sized banks has been introduced by Cascade Data, Inc.

Aimed at institutions that handle fewer than 10,000 transactions daily, the system includes proof of deposit, demand deposit, savings, certificates of deposit, loans, mortgages, payroll, general ledger, memo posting and inquiry capabilities.

The system typically includes a Cascade Data Concept III computer, 10M bytes or 20M bytes of disk storage, a printer and two CRT terminals. Up to 24 CRT terminals may be attached to the system.

The software applications cost $12,500 and the inquiry capabilities cost $2,000 from the firm at 6300 28th St. S.E., Grand Rapids, Mich. 49506.

VAX-11 Gains Video Support

PENNINGTON, N.J. — Pennington Systems, Inc. has announced video terminal support packages for the Digital Equipment Corp. VAX-11 family of computers.

Vidio/11 and SCRNIO/11 — already supported on DEC PDP-11 computers under RT-11, RSX-11M/M+/D and IAS operating systems — are now available on the VAX in native mode.

Vidio/11 offers run-time terminal independence, protected terminal screen, cursor control, "no echo" option, video attributes and partial-screen scrolling. SCRNIO/11 is said to provide screen format management.

A permanent lease for Vidio/11 for one CPU costs $1,500, and for SCRNIO/11, $2,000, with 90-day guarantees from the firm at 65 S. Main St., Pennington, N.J. 08534.

'Finar' Available For VAX Under VMS

DENVER — Finar Systems Ltd. has announced the availability of its Financial Analysis and Reporting (Finar) system on the Digital Equipment Corp. VAX-11 running in native mode under VMS.

Finar has been available for four years on the DEC PDP-11. Current Finar users that follow the migration path from PDP-11 to VAX can continue with no external change in function, a spokesman claimed.

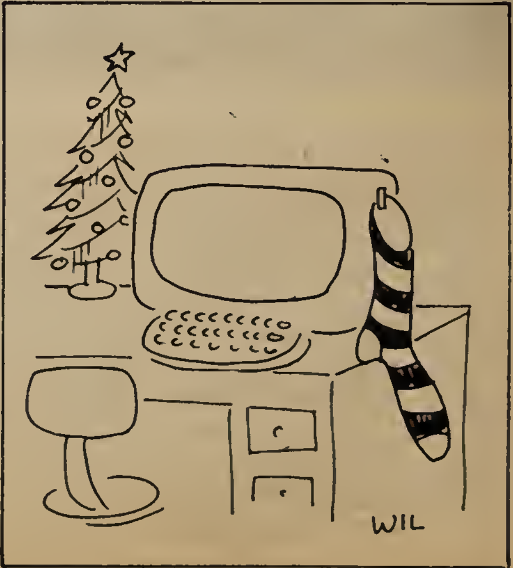
Prices for Finar start at $18,000 from the firm at Suite 2-300, 6000 E. Evans, Denver, Colo. 80222.

Package Assigns Zips In Five, Nine Digits

BURLINGTON, Mass. — Urban Data Processing, Inc. is offering a Street Address Geographic Encoder (Sage) that is said to automatically assign correct Zip Codes for five- or nine-digit codes.

The package is IBM-compatible and can be installed on a user's system under a five-year lease plan.

The base price for the five-year plan is $19,500, the vendor said from 209 Middlesex Tnpk., Burlington, Mass. 01803.



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IEEE Stumped on Access Rights

By Brad Schultz
CW Staff

BEAVERTON, Ore. — As the year winds down, the Institute of Electrical and Electronics Engineers (IEEE) remains stumped on how to distribute access rights in a local network architecture.

At a recent meeting, the IEEE's Local Area Networking Committee narrowed the range of approaches to access rights distribution, but found it could not decide which of two incompatible approaches are better, Chairman Maris Graube told *Computerworld.*

Charged with producing IEEE Standard 802 — a model local net architecture — Graube's committee voted to continue investigating the merits of both carrier sense multiple access collision (CSMA/CD) and token passing. CSMA/CD involves statistical sampling of line traffic to detect collisions of data streams from two or more local net users [CW, Dec. 11]. In contrast, token passing makes collisions impossible by allowing only one user to transmit at a time.

The latest meeting of Graube's committee also featured discussion of the High-Level Data Link Control (HDLC) protocol promulgated by a committee of the American National Standards Institute (Ansi). According to Graube, the IEEE and Ansi committees appear eager to help each other, but HDLC does not recognize the peer-to-peer relationships that are considered necessary for Standard 802.

The Local Area Networking Committee will next meet in Boca Raton, Fla. on Feb. 2-6, Graube said.

Seeks Mass Market Appeal

AT&T Tuned In to Home Info Services

By Phil Hirsch
CW Washington Bureau

CHICAGO — Several insights into AT&T's plans for carving out a niche in the on-line home information market were disclosed here recently by Financial Services Marketing Manager Robert K. Potter. He addressed a conference on home banking sponsored by the Electronic Funds Transfer Association (Efta).

The phone company's immediate objective, Potter said, is to create a "critical mass" of on-line services priced at a level which will appeal to a mass market. AT&T's participation in viewtron, a videotex trial in Miami, and its projected test of a similar system in Austin, Texas are designed to define that critical mass. Potter expects that by 1984 or 1985, the phone company will know what specific services it wants to offer.

Developing the related hardware will be one of its next jobs. A viable terminal for the home information market must be priced at $200 to $250 and include both communications and local processing capability, he said. This is roughly half the price of the cheapest presently available equipment, but within the next two years, AT&T expects technological advances to close this gap.

Price Cut Likely

Another speaker at the Efta conference, Charles A. Phillips, senior vice-president of Radio Shack Corp., the retailing subsidiary of Tandy Corp., reported that the price of Tandy's videotex terminal, now $399, is likely to come down to $200 to $250 "within the near future." Two OEM purchase contracts are scheduled to be announced in the next few weeks, he indicated. The heart of the Tandy terminal is a TRS-80 microprocessor.

Asked by a reporter whether the phone company might give terminals away free to its customers, as the French telephone administration is doing, AT&T's Potter said this question has not really been addressed. He indicated, however, that Bell wants to enter the on-line home information market partly to eliminate some of its present costs.

One goal of the company's forthcoming videotex trial in Austin, for example, is to determine whether an on-line directory information service can reduce the need for printed telephone books and human information operators.

Potter agreed that if these latter costs can be reduced, the resulting savings could lower the price of the on-line terminal, possibly making it cheaper than the terminals offered by competitors.

Besides marketing information services to the home, AT&T also intends to sell support to its competitors, Potter said. Data base storage service billing, communications and application software, transmission, and

(Continued on Page 48)

Rixon Expands Multiplexer Line

SILVER SPRING, Md. — Rixon, Inc. has introduced two additions to its DCX line of intelligent multiplexers.

The DCX836 is a point-to-point statistical mutliplexer that offers error-free transmission of up to 60 asynchronous channels over a single composite link.

The DCX840 network multiplexer offers the same transmission characteristics as the DCX836, but it also offers up to 240 asynchronous channels over as many as 12 composite links, the vendor said.

The DCX836 costs $5,285 (a rack-mountable unit costs $4,750) and the DCX840 costs $9,885 ($9,350 for a rack-mountable unit) the vendor said from 2120 Industrial Parkway, Silver Spring, Md. 20904.

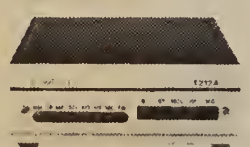
Multiplexers Out For Nova, Eclipse

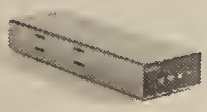
NORTHRIDGE, Calif. — Two communications multiplexers for the Data General Corp. Nova and Eclipse computers running under DOS, RTOS, RDOS and AOS have been unveiled by Quentin Research, Inc.

The Model 4111 is said to be software-transparent to the ULM series of DG equipment, and the Model 4311 is reportedly transparent to the ALM series.

Both multiplexers are single-board designs requiring one slot in the CPU and both contain eight asynchronous ports, one synchronous port, two EIA teletype ports and a real-time clock.

Both models sell for $2,100 each from the firm at 19355 Business Center Drive, Northridge, Calif. 91324.





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AT&T Tuned In to Home Services Market

(Continued from Page 47)

computer processing of the information exchanged by the service provider and his customers are among the offerings being studied for this latter market. "We want the telephone network to be prime communications facility," he added.

Potter brushed aside recent congressional efforts to limit AT&T's provision of on-line information services. The congressional goal, basically, was to prevent AT&T from using its ownership and operation of the nation's telephone network to gain an unfair competitive advantage in the new market.

Although legislation embodying this idea was not enacted, another try is virtually certain next year. Such protection is no longer needed, Potter indicated, since "our monopoly is dead."

He explained that AT&T has voluntarily formed "wholly separate subsidiaries" to provide regulated telephone network services separately from competitive, unregulated computer-based offerings.

The main point of Potter's speech was the alleged superiority of the telephone network, as opposed to cable television, for supporting on-line home information services.

Bob Patrick, manager of business development for Cox Cable Communications, Inc., presented the opposite view. Cox is part of a group developing an on-line home information service for San Diego. Known as Interactive Data Exchange, "Indax," this system is scheduled to begin test operation during the second quarter of next year.

The Indax terminal will cost the user $4 to $6/mo. It consists essentially of a keypad about the size of a pocket calculator.

Through this keypad, the user retrieves data base information which is then displayed on his television screen.

Potter insisted that the telephone network is superior because it serves more homes, provides greater switching capability, and is supported by an organization with greater financial resources.

Patrick insisted that within the next few years, two-way cable networks will be operative within all of the nation's major metropolitan areas and will be capable of reaching at least 90% of the household within those areas.

Cable's broadband transmission capability, he added, gives it an important advantage over the telephone network, which is still saddled with limited capacity analog local loops.

Additional Capital

And although cable television operators lack Bell's resources, they are attracting additional capital. Westinghouse Electric Corp., for example, recently paid $646 million to acquire Teleprompter Corp., the nation's largest cable TV company. American Express Co., the New York Times, General Electric Co. and Capital Cities Broadcasting Corp. have also purchased cable companies recently.

Patrick admitted that the community antenna television industry still faces some problems in competing with the phone company.

Possibly the biggest obstacle is the limited reach of most cable networks. To cover the Los Angeles area, for example, an advertiser or information provider would have to contract with about 20 cable TV systems. That obstacle may be less formidable than it appears.

In most metropolitan areas, multipoint distribution service (MDS) carriers are now delivering commercial and pay-television to competing local networks, and the MDS industry is trying to develop additional markets.

The largest MDS carrier, Microband Corp., was recently acquired by Tymshare Corp., which is now exploring commercial uses of Antiope/Didon, a French videotex/teletext system.

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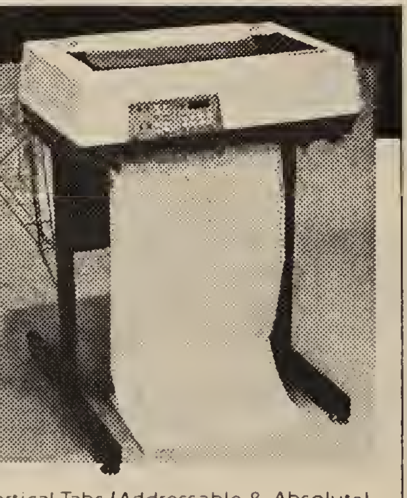

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The M48C Series II Microplexer

Timeplex Multiplexers Boast Interface With 48 Channels

ROCHELLE PARK, N.J. — Two multiplexers that reportedly interface with up to 48 data channels are available from Timeplex, Inc.

Both models include the supervisory port, which functions as a "window" into the system and can be configured for single link or dual data link capabilities, the vendor claimed.

Designated the M4825 "Permanent Channel Assignment" and M4826 "Traffic Bypass" models, each uses dual 9,600 bit/sec data links providing aggregate data input rates up to 460,000 bit/sec, a spokesman said.

The M4825 assigns each data link to its own remote, single link microplexer. Channels are assigned on a "permanent address" basis to one or the other of the two data links. This allows the M4825 microplexer to replace two 24-channel multiplexers serving two remote sites, he said.

The M4826 incorporates two built-in data links and can shuttle information among three separate sites to meet an assortment of networking configuration requirements, the spokesman claimed.

Both basic models are priced at $5,000, the vendor said from One Communications Plaza, Rochelle Park, N.J. 07662.

Terminal Offers Text Options

SAN JOSE, Calif. — A daisy wheel terminal with programmable keyboard, nonvolatile memory, bidirectional printing, optional 1,200 bit/sec full-duplex operation and text enhancements is available from Anderson Jacobson, Inc.

The AJ833 Keyboard Printer Terminal features such optional text enhancements as proportional spacing, boldface printing, automatic centering, justification and underscoring. Its nonvolatile memory stores margins, tab settings, forms control and program key settings, pitch and plot modes, according to the vendor.

Every key can be programmed by the user to perform any character function, a spokesman said. In addition, seven keys can be programmed to perform repetitive functions of up to 31 steps at the touch of a single key for automatic log-on operations or other routines.

The unit costs $3,995, from the vendor at 521 Charcot Ave., San Jose, Calif. 95131.

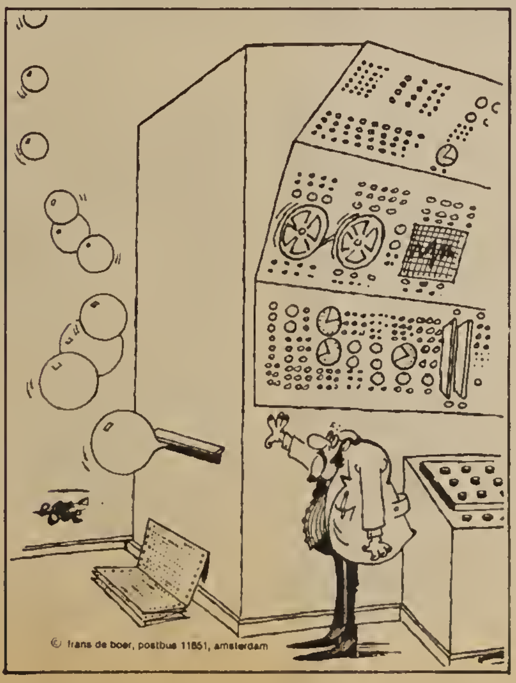
Interface Gives Pulse Dialing

SUNNYVALE, Calif. — An automatic dialing interface said to allow data terminal equipment to do pulse dialing on the switched network is available from Prentice Corp.

Model P-701 is FCC-registered for direct connection to the dial network, according to a company spokesman. The device reportedly allows a CPU or intelligent terminal to establish dial-up links without a telephone set or other external equipment.

EIA-plug-compatible with any Prentice dial modem, the unit operates in two modes: normal and bypass, where it is electrically removed from the circuit for modem testing. The unit derives its power from the modem.

The Model P-701 costs $175 from the firm at 266 Caspian Drive, Sunnyvale, Calif. 94086.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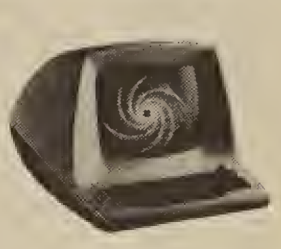

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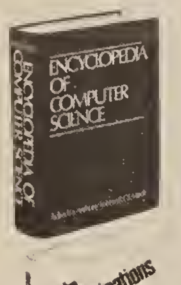

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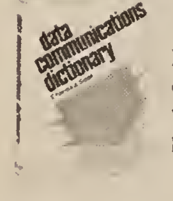

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HM159 Elementary Structured COBOL: A Step by Step Approach, 2nd Ed.
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This is a problem-oriented approach to writing and maintaining well-structured programs in COBOL. Practice exercises in writing programs begin immediately so that the reader can grasp the fundamentals of COBOL through application. There is added emphasis on structured programming and disciplined program writing, as well as a more convenient explanation of the COBOL features pertaining to sample programs. **$14.95**

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BP029. Distributed Information Systems, *Harry Katzan.* This book breaks new ground for computer professionals, engineers, and managers of DP facilities in the way it covers the basic concepts, the technology, and the managerial intricacies of distributed information systems. **$20.00**

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EDISON, N.J. — By making the jump from IBM to Memorex Corp. peripherals, a leading manufacturer of heating and air conditioning products here has shaved nearly $400,000 off its DP budget this year.

Earlier this year, Fedders Corp. replaced its IBM disk, tape and communications equipment with Memorex devices and reportedly improved the cost/performance of its DP operations. The decision to scrap the IBM equipment was made in early 1979 as part of an extensive cost-reduction program that encompassed all of the firm's departments and its three other production facilities located in other states, according to Robert Gutmann, Fedders' corporate director of management information systems.

"One way to ensure that DP is making positive bottom-line contributions is to make certain the operation is as cost-effective as possible," Gutmann said.

Fedders' present computer system, installed in 1977, is an IBM System/370 Model 158-3 with 1.5M bytes of memory. The computing center, which serves all corporate and many remote plant computing needs, employs some 60 people, including 25 programmers. The center operates three shifts on a five- or six-day-per-week schedule, depending on the job load and has an operating budget that has been growing at about 15%/year for the past several years.

System Evaluations

When system evaluations were started last year, the Edison facility had eight IBM 3350 disk spindles and 16 IBM 3330-11 spindles for on-line data storage, and eight IBM 3420 tape drives for off-line applications, Gutmann explained.

The conversion to Memorex disk and tape storage equipment offered several advantages to Fedders, according to Gutmann. The company was able to reduce its monthly expenditures by about 10% below its costs for the equivalent IBM hardware. Also, Fedders was able to realize a sizable financial gain on its previously installed IBM gear through an innovative broker benefits package recommended and handled by Memorex.

To date, Fedders has installed 20 Memorex 3650 disk spindles, with 12 more on order. When all of the new 317.5 M-byte/spindle equipment is in, the center will have a total on-line storage capacity of 10,160M bytes, nearly double the previous total. In addition, Fedders has installed eight Memorex 3228 tape drives to replace the IBM 3420 units.

At Fedders, the 3650 dual-spindle disk modules are connected in two strings through a pair of 3653 direct-access storage modules and controllers to an integrated storage control unit. This unit, in turn, is attached to the system block multiplexer on the 370/158-3 CPU.

The new disk configuration has enabled Fedders to increase its data base by about 50%, while adding only four additional modules over the number previously installed. "Since the Memorex 3650's have higher storage capacity than the replaced 3330-11 devices, we have been able to reduce the total amount of floor space per megabyte," Samuel L. Schumer, data center manager, noted. "This will be important to the center when further capacity upgrades are required because they can now be added without enlarging the physical size of the computer room."

System Throughput

Along with better facilities utilization, system throughput has reportedly been enhanced through the installation of the Memorex tape drives. Because of the higher tape speeds and data transfer rates of the 3228 drives — 200 in./sec and 1,250K byte/sec, respectively — higher efficiency has been achieved in dump/restore operations, Schumer said.

To maximize the efficiency of the new system, about 80 CRT terminals, many with 1,200 line/min printers, allow users throughout the Edison plant to access the computer for either data entry, or for retrieval and/or print-out of information. In the research and development laboratories, for instance, engineers can test new designs for heating and air conditioning products through computer modeling.

Test results can be retrieved and hard copies obtained for review through display terminals located right in the development engineering departments. In other areas, such as purchasing, order entry and inventory control, terminals and printers help assure fast, accurate response to other department needs or to customers throughout the world.

In addition to the Edison data center, each of Fedders' three other plants have their own DP capabilities to support a variety of activities relating to its own particular operation. At Buffalo, N.Y. and Frederick, Md., for example, DP is handled through on-site System/34 computers. At the Effingham, Ill. facility, the company has a newly installed 4331 processor which is supported by terminals and remote job entry stations throughout the plant.

Portable Terminal Joins MSI Line

COSTA MESA, Calif. — A portable data entry terminal — the MSI/88e-a — that brings an alphanumeric display to MSI Data Corp's. top-of-the-line numerical data entry family of Omega Generation user-programmable terminals has been introduced.

The 88e-a shares the 16-digit, 14-segment light-emitting diode display of the 88f and has the same keyboard and digit memory storage of the 88d numerical data entry terminal, the firm said.

The terminal's prompt/response capabilities allow data entry personnel to be "walked through" a data collection application, created by the user, the vendor said. The 88e-a is compatible with MSI's portable terminal accessories, including word scanners, and with its terminals' communication protocols, including full two-way communications and down-line loading of programs.

The 88e-a costs $1,200 and will be available in January 1981 from MSI at 340 Fischer Ave., Costa Mesa, Calif. 92626.

Power Unit Guards Against Transients

SAN JOSE, Calif. — RKS Enterprises, Inc. is offering a 220V power surge control device that reportedly protects computers, communications, medical and other electronic equipment from voltage transients.

The SS-220-H plugs into a standard 220V outlet and responds in picoseconds with a rated dissipation of 600,000W at 100 microsec. The unit has a neon light that indicates it is working properly.

The SS-220-H costs $99.50 from RKS Enterprises at 643 S. 6th St., San Jose, Calif. 95112.

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Tablet 1400

A graphics analysis tablet said to offer "a delicacy of distinction" accurate down to .001 in. has been announced by Numonics Corp. The portable Tablet 1400 has a 16-key integrated keypad cursor and an LED presence indicator and controls the system setup and analytic functions. The 24-in. by 24-in. version costs $5,000; the 36-in. by 48-in. version costs $6,500; and the 42-in. by 60-in. version costs $8,000 from the firm at 418 Pierce St., Landsdale, Pa. 19446.

Including Graphics Systems

Market Data Adds Options

NEW YORK — Market Data Systems, Inc. is offering five product options. The first two are graphics systems for displaying commodities price movements on the user's Market Data video monitor or plotter. The stripped-down version costs $11,000 with a $1,000 monthly charge. The second, more elaborate, version costs $22,000 with a $1,300 monthly charge.

The third option is a message-switching capability allowing the user's in-house computer to send interoffice administrative messages and charts. It costs $1,500 alone, $6,500 on the first graphics system and $14,500 on the second. A solid-state electronic wall-mounted quote board is the fourth option. Its base price is $16,000.

The final option costs $200 a month as part of the vendor's expanded network. The expanded network will allow simultaneous access to the customer's in-house computer data base as well as to the vendor computer center by personnel in a branch office location. Market Data is at 3835 Lamar Ave., Memphis, Tenn. 38118.

Interface Ties Versatec, LSI-11

SANTA CLARA, Calif. — Versatec, Inc. is offering a single-board interface that reportedly allows Digital Equipment Corp. LSI-11 microcomputer systems to use any Versatec electrostatic plotter or printer/plotter, input/output multiplexer, hard-copy controller or vector-to-raster converter.

The Model 125 single-board interface provides for printing speeds up to 1,000 line/min and plotting speeds up to 34 sq ft/min, the vendor claimed.

The interface package costs $1,600, the vendor said from 2805 Bowers Ave., Santa Clara, Calif. 95051.

Media 12/7 Gets Graphics Option

NASHUA, N.H. — Sanders Technology is offering a graphics option for its Media 12/7 typographic printer that allows line drawings and coarse gray-scale drawings to be created on the printer.

The graphics option consists of a memory expansion board, two graphics fonts and special version of the printer software.

The graphics option is available for $500, the vendor said from Box 1226, Nashua, N.H. 03061.

Recorder/Scanner Runs 25 Line/Sec

CHELMSFORD, Mass. — A high-speed, large-format scanner/laser recorder that generates continuous tone and screened black and white images on photographic film for raster map scanning and digitizing is available from Optronics International, Inc.

The X2430 digital argon laser recorder/scanner writes up to 1,500 line/min or 25 line/sec at all rasters on a variety of film types, the vendor claimed.

The product offers a "personality" module to simplify the interface to a computer, as well as a selection of apertures and rasters and an unsharp masking vacuum hold down and user-defined pin registration system.

The product is priced under $200,000 and delivery time is nine months, from the vendor at 7 Stuart Road, Chelmsford, Mass., 01824.

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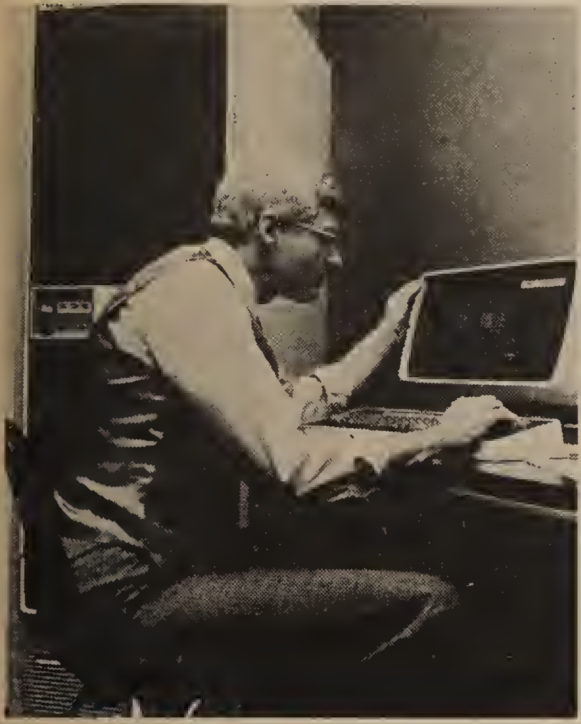

The Control Business System

GREENWICH, Conn. — A small business computer system geared to handle the administrative functions of small and medium-sized companies has been introduced by the Service Bureau Co., a data services division of Control Data Corp.

The Control Business System series consists of five models — the 20, 30, 40, 60 and 80, each one incorporating either a Data General Corp. Eclipse S/140, Nova 4/X or Micronova MP200 processor.

The systems range in memory from 64K- to 512K bytes, can be fitted with a maximum of 790M bytes disk storage and can support up to 32 terminals in the system's largest configuration. The packages also include either a 60 char./sec or 900 line/min printer, a spokesman said.

Initially, the systems will be tailored toward the business needs of the wholesale distribution market. The vertically aimed software includes order entry and billing, inventory control, accounts receivable and sales, purchase order control, accounts payable, general ledger and payroll. The system operates under DG's DOS and Rdos operating systems and is programmed in Business Basic, the spokesman continued.

The entire system will be maintained by DG under a standard service contract, he added. The systems will sell from $25,000 to $150,000 and will be marketed initially in New York, Philadelphia, Chicago, Houston and Los Angeles.

The Control Business System is not the first computer offering by CDC's data services division. Other systems marketed by the company include Focus One, a computer aimed at credit agencies, and Cybercredit, a system that helps in the collection of loans and outstanding accounts.

Additional information on the small business computer system can be obtained from the Service Bureau Co., 500 W. Putnam Ave., Greenwich, Conn. 06830.

Wang Entry-Level Text Processor Debuts

By Ann Dooley
CW Staff

LOWELL, Mass. — Wang Laboratories, Inc. has unveiled its Wangwriter, an entry-level, stand-alone text processing system aimed at capturing the increasingly competitive office automation market. The system also features a multicluster facility to connect its word processing (WP) functions with its DP product line.

In addition to the Wangwriter, Wang also introduced the Wang Minidiskette Workstation that allows the Wangwriter to transfer data to and from Wang Office Information Systems (OIS) — the Wang Remote Cluster Facility that allows OIS terminals to perform DP processing tasks when remotely connected to any Wang Virtual Storage (VS) computer system and various communication protocols.

Designed for the electronic typewriter marketplace, the Wangwriter is targeted at small firms or small departments within large companies — a customer base not usually serviced by Wang.

Competition for IBM

Although Wang claims its new unit is not intended to compete directly against the IBM Displaywriter, the Wangwriter is reportedly available for immediate delivery in selected U.S. cities, unlike the IBM product, which features long delivery dates. As many as 10,000 units will be available within the 12-month period, Wang claimed.

The modularly designed Wangwriter consists of a CRT terminal, movable keyboard and a printer console with minidiskette drives and 20 char./sec Wang Daisy print wheels that print 10-, 12- or 15 char./in.

The CRT terminal is a 12-in. screen capable of displaying 24 lines, with 80 char./line. Horizontal scrolling allows text lines of up to 158 char., the firm said.

The 5.4 in. double-sided, double-density minidiskette serves as a utility and storage medium, capable of storing 60 pages each. Three minidiskettes are provided with the system, one for document storage, the second for software and utility loading and the third for diagnostic testing.

The printer prints bidirectionally at an average rate of 20 char./sec, and the system features a typewriter-like keyboard with the addition of operational keys and a cursor movement keypad.

Each time the system is powered on, the unit automatically performs a series of diagnostic tests to ensure that the system is running optimally or, in case of a malfunction, ensure early detection and quick recovery.

Human Factors

Human factors are emphasized, according to the firm, which noted that the unit's keyboard can be moved up to 10 ft away from the printer console and a pivotal CRT terminal screen is included that reduces office glare.

The Wangwriter features automatic word wraparound, automatic centering, decimal alignment and right-hand justification, as well as advanced functions of Super Copy, Super Move and a special type-through mode that permits information to be typed at the printer and then displayed on the screen simultaneously. Special functions include document deletion, diskette duplication and default format modification.

An additional feature is Glossary, which allows commonly used words, phrases and paragraphs to be prestored on a diskette and then instantly retrieved and displayed on the screen.

The Wang Minidiskette Workstation, an

(Continued on Page 54)

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Telpar Adds PL-20EX Unit To 20-Column Printer Line

ADDISON, Texas — Telpar, Inc. has introduced the PL-20EX, an addition to its line of 20-column printing devices.

The unit is available with an RS-232, a 20mA loop and TTL serial interfaces. The unit and its parallel interface counterpart, the PL-20E, are available with enclosure and ac or dc power, the vendor said.

Standard features include a 5- by 7-in. dot matrix print head, a 2.5 line/-in. print speed and 91 printable Ascii char., the vendor said.

The unit also features invert mode and paper-out sensor. "Compact size and low power requirements" were cited by the vendor as further advantages.

The PL-20EX costs $315. With the enclosure and ac supply, it costs $513 and the unit costs $593 with dc power supply.

Telpar is headquartered at 4132 Billy Mitchell Road, P.O. Box 796, Addison, Texas 75011.

Scott Interfaces VET/2 to Apple II

DALLAS — An interface which permits Scott Instruments VET/2 voice entry terminals to interact directly with any 48K-byte Apple II microcomputer is now being offered by Scott. The enhancement gives the microcomputer truly integrated speech recognition for the first time, Scott claimed.

The VET/2 plugs into any slot in the Apple II and is linked functionally to the keyboard, allowing the user keyboard or voice input.

The terminal lets Apple users run "integer" Basic, Applesoft and machine-code programs by voice input with no program modifications.

The VET/2 is supplied with preprocessor, interface board, software with demonstration programs, headset, microphone and operators manual. The terminal with Apple interface costs $895.

Scott is at 815 N. Elm, Denton, Texas 76201.

Two DG Compact Tape Drives Use Streaming Method for Disk Backup

WESTBORO, Mass. — Data General Corp. has introduced two compact tape drives designed for disk backup.

The drives use streaming technology and 1,600 bit/in. recording density and a full IBM/Ansi .5-in. tape file exchange capacity.

DG's Model 6123 drive can be used for Micronova computer systems, and the 6125 can be used on Nova and Eclipse systems, the vendor said.

Prices start at $6,600 for the smaller 6123 tape drive, the vendor said from Rt. 9, Westboro, Mass. 01581.

DEC Minis Back CDC Drives

BURLINGTON, Mass. — An intelligent peripheral processor from Xylogics, Inc. reportedly allows Digital Equipment Corp. Unibus computer users to add Control Data Corp. disk drives of mixed capacities to their systems.

The Model 650, which also supports the BASF 8-in. Winchester 24M-byte disk drive, is said to emulate DEC RM02, RM03 and RM05 disk drives and will operate with RT-11 V4, RSX-11M V3.2, RSTS/E and IAS/RSX-11 operating systems.

The unit costs $3,200 in quantities of 25 to 49 from the firm at 42 Third Ave., Burlington, Mass. 01803.

System Eases Administration

(Continued from Page 53)

accompanying product introduced by Wang, is a peripheral device available on all Wang Office Information Systems and will provide media compatibility with Wangwriter minidiskettes, as well as function as a standard 64K OIS workstation.

The primary function is to provide for Wangwriter/OIS media compatibility and document transfer, Wang said. Documents being transferred to or from the Wangwriter will follow all Wangwriter conventions; a maximum of 4,000 char./page and 15 page/document. The workstation costs $6,200 and will be available the beginning of May 1981.

The remote Cluster Facility for Wang VS and Computer Systems and OIS systems, which was also introduced last week, allows a user to logically connect the WP and DP product lines, according to Wang.

Wang also enhanced both its 2200 Series Small Business Computer product line and its VS computer systems family with support for industry standard communications protocols.

IBM 3271 support capabilities for 2200 computer users allow direct communication to host mainframes within a 3271 bisynchronous network, while maintaining local system responsiveness, Wang said.

This enhancement consists of a new 2228D data communication controller and the 22TC-3271 software package, which include the emulation of a 3271 Model 2 control unit, 3277 Model 2 display station and 3288 Model 2 printer, supporting line speed of up to 9,600 bit/sec.

Additional Capabilities

Further communication capabilities are expected for the 2200 series, according to Wang. The 22TC-3271 emulation package software carries a one-time license fee of $1,000, with shipments beginning this month.

Support of Systems Network Architecture and Systems Data Link Control (SNA/SDLC) within the VS computer systems family was announced so that a level of functional compatibility is achieved allowing coexistence to 3274/76 in a transparent mode, interactive communications and 3777 Model III functions for batch transmission services, according to Wang. The VS systems utilize a telecommunications processor that can support up to four active communication lines and SNA emulation software. TCP costs $5,000, $6,000, $7,000 and $8,000 for the one-, two-, three- and four-port versions, respectively. The 3274/76 emulation and 3777-III emulation are available for a $1,500 license fee each.

The Wangwriter sells for $7,500 from the firm at One Industrial Ave., Lowell, Mass. 01851.

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VDC Sees Industry Unscathed By World Recession Pressures

WELLESLEY, Mass. — Despite the fallout related to inflationary and recessionary pressures in the world economy, the computer industry will emerge relatively unscathed, with annual industry shipments growing at 15.3% between now and 1982, according to a recent survey.

Based on projections by Venture Development Corp. (VDC), computer industry shipments should hit $49.2 billion in 1982, up from $27.9 billion in 1978. This growth will be 50% greater than the consumer electronics market for the same period, the survey noted.

The study, "The U.S. Computer Industry 1980-1982: A Strategic Analysis," tracks the growth rate of three industry sectors — processors, peripherals and data storage systems.

The value of processor shipments will grow 15.6% annually, making it the fastest growing of the three sectors analyzed. Within this category, small business systems will have the highest annual growth rate, 39.1%, with desktop computers showing a 36.5% dollar growth rate and the value of minicomputer shipments' growth pegged at 26.7%.

The value of computer peripheral shipments will increase 14.8% annually through 1982, VDC projected. Within this category, shipments of graphics CRT terminals will show an exceptional 34.7% growth rate, while nonimpact printers will follow a close second, sporting a 30% annual growth rate.

Growing at a slightly slower rate than the other two categories, data storage or memory devices will show a 13.8% annual growth rate. While tape drives show only modest increases, disk drive shipments will expand markedly, with floppy disk drive shipments increasing 40.5% annually, VDC predicted.

In addition to forecasting U.S. shipments for every major product, VDC's study identifies marketing and technology trends impacting specific product groups. The report costs $950 and can be obtained from VDC at One Washington St., Wellesley, Mass. 02181.

Burroughs Eyeing Long-Term Profits In Earnings Cuts

DETROIT — In order to assure its long-term profitability, Burroughs Corp. has adopted or is contemplating several programs which are expected to reduce its 1980 earnings by about $3 per share.

If all the programs are instituted, they will reduce this year's earnings by $125 million after taxes. This reduction in earnings will result in part from Burroughs' recently announced plans to ditch its scientific processor program.

Other changes under consideration are phasing out the company's calculator and adding machine products, consolidating several similar but small plants, closing certain small overseas marketing subsidiaries and changing inventory valuations including provisions for obsolescence.

The firm declined to comment on what definite plans have been made, but said it would announce these at the time it made public its year-end results in January.

Last year the firm earned $7.45 per share. Through its third quarter, Burroughs' earnings totaled $3.65 per share.

In an unrelated announcement, Burroughs also disclosed that the stockholders of System Development Corp. had approved the acquisition of its firm by the Detroit mainframer, which will become effective Jan. 5.

Four Phase To Buy Two Pi

By Marcia Blumenthal
CW Staff

CUPERTINO, Calif. — Four-Phase Systems Corp. has reached an agreement in principle to acquire Two Pi Corp. through an exchange of common stock, which could total $10 million.

If the merger is completed, Four-Phase, a maker of interactive front-end systems typically hooking into an IBM host, intends to offer the Two Pi system as a back-end processor handling batch or data base processing, a company spokesman said. Four-Phase's systems are communications-oriented and sometimes considered an alternative to IBM's 8100.

Located in Sunnyvale, Calif., Two Pi manufactures an IBM plug-compatible system — the V/32 — in the range of the 370/138 and 4331. However, Four-Phase said it is not going into the plug-compatible business.

Two Pi supplies its systems primarily on an OEM basis. One of its better known customers is National CSS, Inc., which markets the Two Pi processor as its 3200 system. To date, 150 Model V/32s are estimated to have been installed.

Two Pi is a wholly-owned subsidiary of U.S. Philips Corp. U.S. Philips reportedly agreed to sell the company because it had

(Continued on Page 59)

Panelists Forecast Fair Skies In Semi Outlook for 1981

By Jeffry Beeler
CW West Coast Bureau

SANTA CLARA, Calif. — U.S. semiconductor makers will probably see a few financial storm clouds next year, but, fair economic skies will generally prevail over most of Silicon Valley and the rest of the nation's high-technology industry.

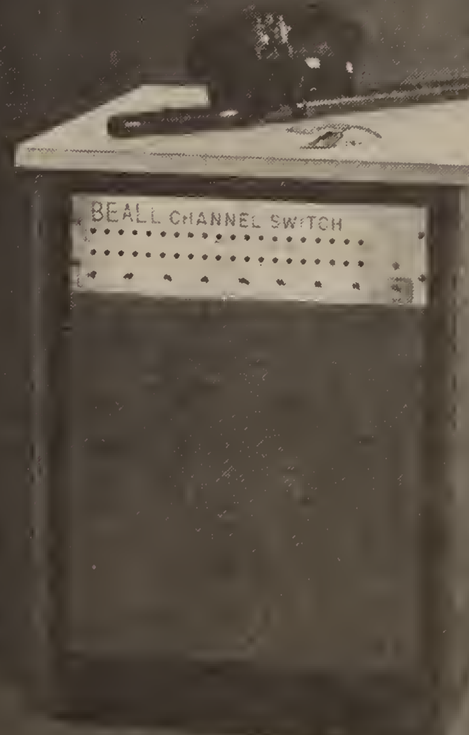
That statement sums up the views expressed at the latest installment of the "annual outlook dinner meeting" sponsored by the Semiconductor Equipment and Materials Institute (Semi).

The Dec. 10 meeting featured four panelists, each of whom was asked to forecast the semiconductor industry's economic future for the coming year and beyond. The panelists included Rolm Corp. Executive Vice-President Leo Chamberlain, Harris Corp. vice-president and General Manager James Dykes, Dataquest, Inc. Senior Vice-President James Riley and Dean Witter Vice-President Hans Severiens.

Each of the speakers addressed the topic at hand from a slightly different perspective, but on one point they all agreed: During the coming months and years, the U.S. semiconductor field will almost certainly continue its familiar pattern of rapid growth, high customer demand and worldwide market leadership.

The only thunderhead visible on the industry's business horizon is the fear that the early part of 1981 could bring a brief period of renewed recession, Severiens said. Otherwise, integrated circuit manufacturers can look forward to a prolonged season of nearly uninterrupted prosperity.

(Continued on Page 59)



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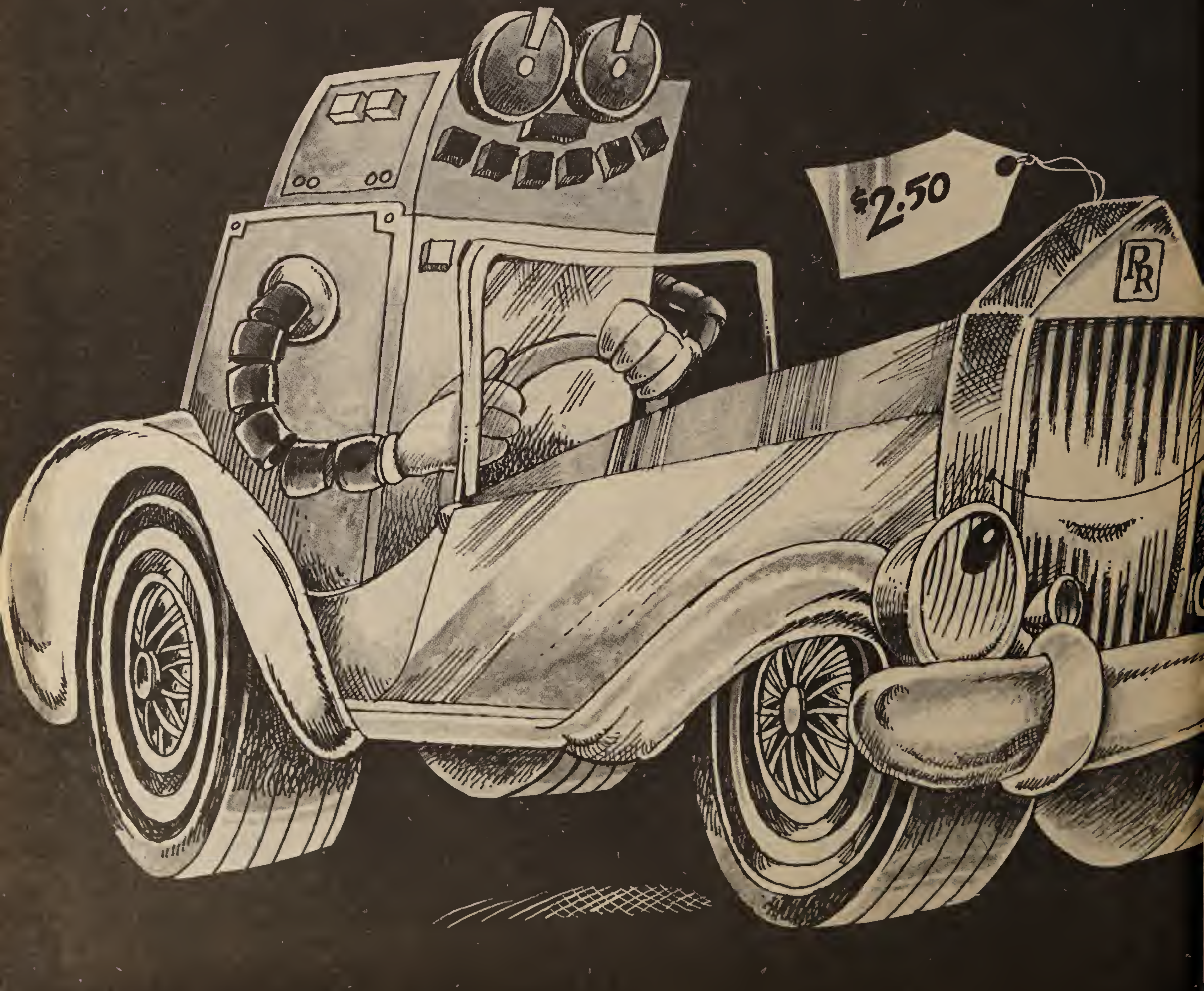

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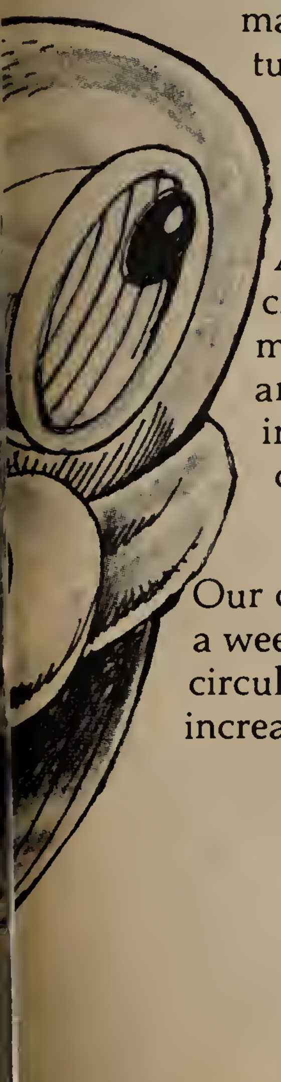
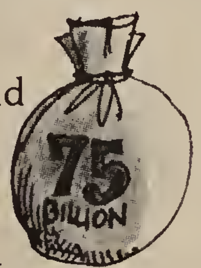
In only thirty years the industry has gone from the development of the giant Eniac system, through the tube-powered, water-cooled Univac I (the world's first business computer), to the incredibly cheap, battery-powered microprocessor.

But as unbelievable as the last 30 years have been, the next 30 will probably be even more incredible. Right now, IBM has begun delivery of a new computer series that will, by itself, provide four times as much processing power as all the previous computers delivered by the company. And they have announced a new "super-conductor" that could improve computer speed and performance by a factor of 500 in the next seven years! It's hard to remember this is real science, not fiction.



This extraordinary increase in efficiency has led to a rapid expansion in computer use, as human ingenuity finds more and more applications for these powerful tools. So the market for computer products and services has turned out to be more elastic than most observers had thought. Worldwide expenditures are currently at $75 Billion, and growing by 20% a year.



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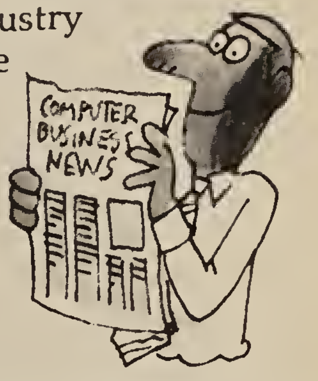

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In Office Automation Race

Wang Revving to Beat IBM, Xerox

By Ann Dooley
CW Staff

LOWELL, Mass. — Wang Laboratories, Inc. is revving up to beat out its bigger and stronger competitors, IBM and Xerox Corp., in the office automation race.

During the recent announcement of its Wangwriter and related products — which one official called the "worst kept secret in the industry" — Wang outlined its definition of the office automation marketplace and indicated some future directions the company would be taking.

To achieve success, an office automation supplier must focus on six areas — word processing (WP), data processing, image processing, audio processing, networking and human factors, according to John Cunningham, executive vice-president for field operations.

Already a leader in WP, DP and human factors, according to Cunningham, Wang intends to pursue development of the three remaining areas and will provide users with tangible results in the short-term future.

Hinting at developments within the next 24 months, Frederick Wang, vice-president of market planning and development, stated the company would have 12 pilot projects in place that would involve new technology in all six key areas and would also spawn new products. The installation will be within Wang's current user base, Wang said.

Systems Approach

According to Fred Wang, networking is the backbone of all the office automation technologies, and Wang plans to implement a systems approach to the concept.

This will be accomplished by tying in local networks in which Wang products communicate with other Wang products in one building or site; remote networks in which Wang products communicate with others from site to site; and networks in which Wang products communicate to non-Wang products.

Calling this networking "gateways," Wang said the company will concentrate primarily on developments in local networks. Development of a digitally encoded broadband cable network is currently under way, using techniques from cable television, according to Wang.

The technology will be implemented at the department level so that individual user needs — something that Wang wants to emphasize — will be served.

Wang will also be focusing on business graphics, computer modeling programs, facsimile transmission, video conferencing, voice synthesis, voice store and forward and telephony in developing future products.

What will give Wang the leading edge over its competition will be its attention to man-machine interface, Wang officials concluded.

ASI Countersues Deltak

ARLINGTON HEIGHTS, Ill. — Advanced Systems, Inc. (ASI) here recently filed a defamation suit against Deltak, Inc. and its president, Robert King, and has countersued Deltak alleging unfair competitive practices and misappropriation of trade secrets.

The countersuits, filed in the Circuit Court of Cook County, are answers to two suits filed by Deltak, one of which was against ASI and Paul Pinney and the other against one Jay Lassman, according to ASI president and chief executive officer John DeAno.

The defamation suit, which seeks $2 million in damages, arose in connection with comments made by King primarily in *Crain's Chicago Business* when Deltak filed its suits against ASI.

The two firms are the major vendors of multimedia training courses aimed primarily at the DP community.

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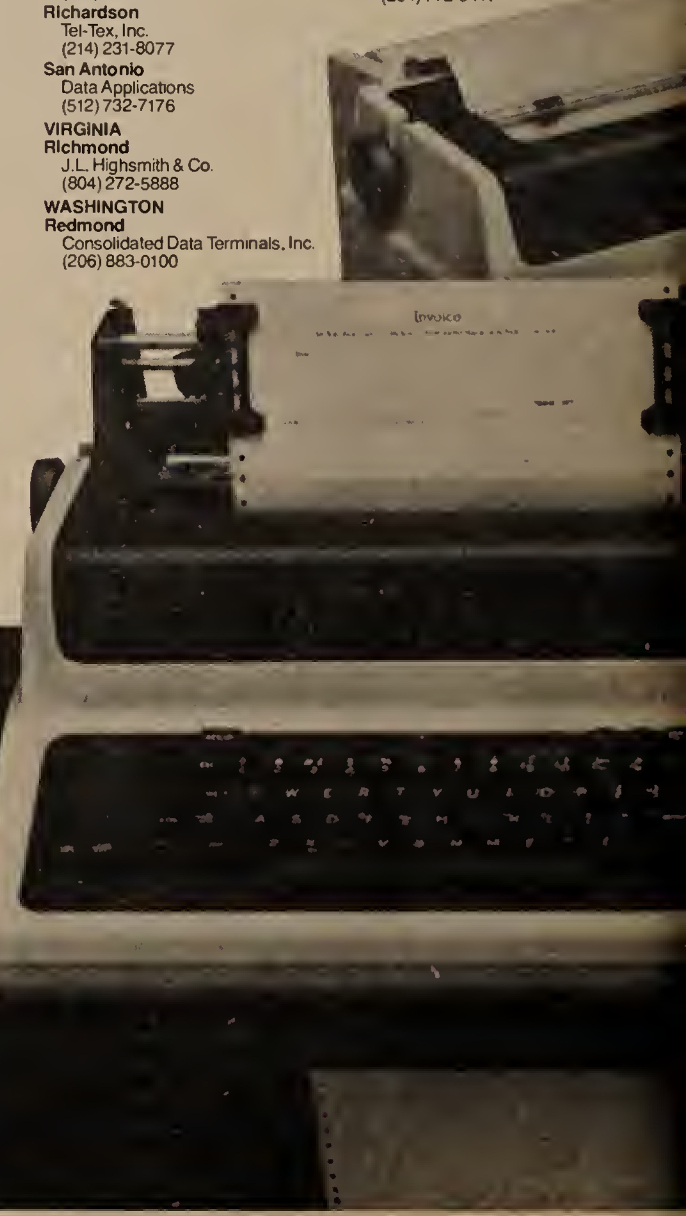

Panelists See Fair Skies in 1981 Semi Outlook

(Continued from Page 55)

Severiens described the U.S. economy as currently being in the midst of a "W-shaped" recession. "The first 'V' of that recession occurred earlier this year and is now behind us," the Dean Witter executive said. "Soon, we'll be entering the second 'V,' which will probably last until next summer when we can expect to see the first signs of an economic recovery."

Unlike the first "V," the second "V" of the U.S.' ongoing economic downturn is expected to bring "no severe business contractions," Severiens predicted.

Part of Severiens' optimism about the semiconductor industry's near-term business outlook, he said, stems from his belief that the incoming Reagan administration will adopt economic policies that will inhibit federal spending and thus perhaps ease inflationary pressures.

Severiens also bases his optimism on the recent passage of a federal tax law that, among other things, provides financial incentives for incremental research and development.

Such legislation is clearly aimed at encouraging increased R&D spending, which is sadly deficient among many U.S. semiconductor firms, he said.

In other good news for the industry, Harris' Dykes predicted continued U.S. high-technology leadership through at least 1985. In both product development and international marketing expertise, domestic semiconductor firms will maintain a clear superiority over their overseas counterparts, Dykes said.

For all their strengths, however, U.S. high-technology companies during the next five years are still expected to lose a "slight" part of their worldwide market share to Japanese vendors, which are confronting American industry with a growing competitive threat, the Harris executive said.

Domestic suppliers will also find themselves severely tested by a continuing shortage of both R&D funding and skilled technical personnel. Dykes blamed much of the manpower shortfall, which is expected to run as high as 20% to 25%, on the failure of U.S. universities to produce enough engineers and other technical professionals to keep pace with industry demand.

As one potential remedy for the growing labor problem, Dykes urged U.S. semiconductor makers to expand their use of occupational retraining.

Four Phase, Two Pi Sign

(Continued from Page 55)

made a large investment in product development into the system, which is now tested extensively in the field. However, U.S. Philips does not have a U.S. marketing organization that could provide widespread distribution for the product.

By contrast, Four-Phase has a large marketing organization and a sizable customer base.

During the next several weeks, the two companies will work out the arrangements of the acquisition. One point to be ironed out is how Two Pi's already established OEM commitments will be met. The firm will be operated as a wholly-owned subsidiary of Four-Phase, and it is unknown to what extent Two Pi will continue to offer the system on an OEM basis.

The proposed acquisition could involve an exchange of up to 400,000 Four-Phase common shares. The completion of a definitive agreement is expected in January.

It is anticipated that if the acquisition is completed, Four-Phase will retain Two Pi's current management.

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Proffers Reforms and Legislation

DG Exec Ties 'Power of Future' to Public Policy

By Deborah Wise
CW Staff

CAMBRIDGE, Mass. — "The power of the future" may lie in the hands of today's engineers and computer designers, but they must recognize the effects public policies have on their ability to design, manufacture and sell computers.

In an address given as part of the Distinguished Lecture Series at MIT, Edson D. de Castro, president of Data General Corp., pinpointed five areas that, although not specifically related to technology, will influence its progress. De Castro also suggested reforms and legislation to help the computer industry.

The five issues involve capital investment, capital formation, the funding of research and development, human resources and international trade. "For computer companies to get started, grow and prosper requires that they raise capital, maintain state-of-the-art test and development equipment, undertake new research projects, advance educational programs and compete successfully throughout the world," de Castro said.

- Capital gains tax inhibits venture capital investment in start-up companies and expanding companies, said de Castro, who talked of his own experience, 12 years ago, when he formed DG.

"Had we waited one more year, it is possible that Data General would never have got started. The following year, the federal government raised the capital gains tax to 49%," he said.

However, this policy, designed to increase government revenue, failed. The tax was decreased last year to 28%, which de Castro said has resulted in "a doubling of new capital raised from initial offerings and a $200 billion increase in equity values.

"Any company in the computer and electronics industry that grows faster than 20% a year has difficulty generating enough cash itself to support growth. Thus, raising capital from other sources is necessary. Now, with improved incentives to invest, companies can raise money to grow somewhat easier," he said, but pointed out that many companies do not have a capital gains tax at all.

"The computer and electronics industry is now working with Congress to further reduce the capital gains tax in order that we may obtain greater funding that can produce economic growth and productivity," according to de Castro.

- Once a company has been formed it needs a capital formation base to keep competitive. However, equipment is expensive and becomes obsolete quickly.

De Castro advocated a reform in the depreciation laws that would allow companies to recover the cost of buildings and equipment as fast as they use them up.

A bill, currently before Congress, would allow for equipment write-off in five years, but de Castro said this is geared towards more mature companies. "It hurts fast-growing electronic and computer companies that need new equipment every two or three years."

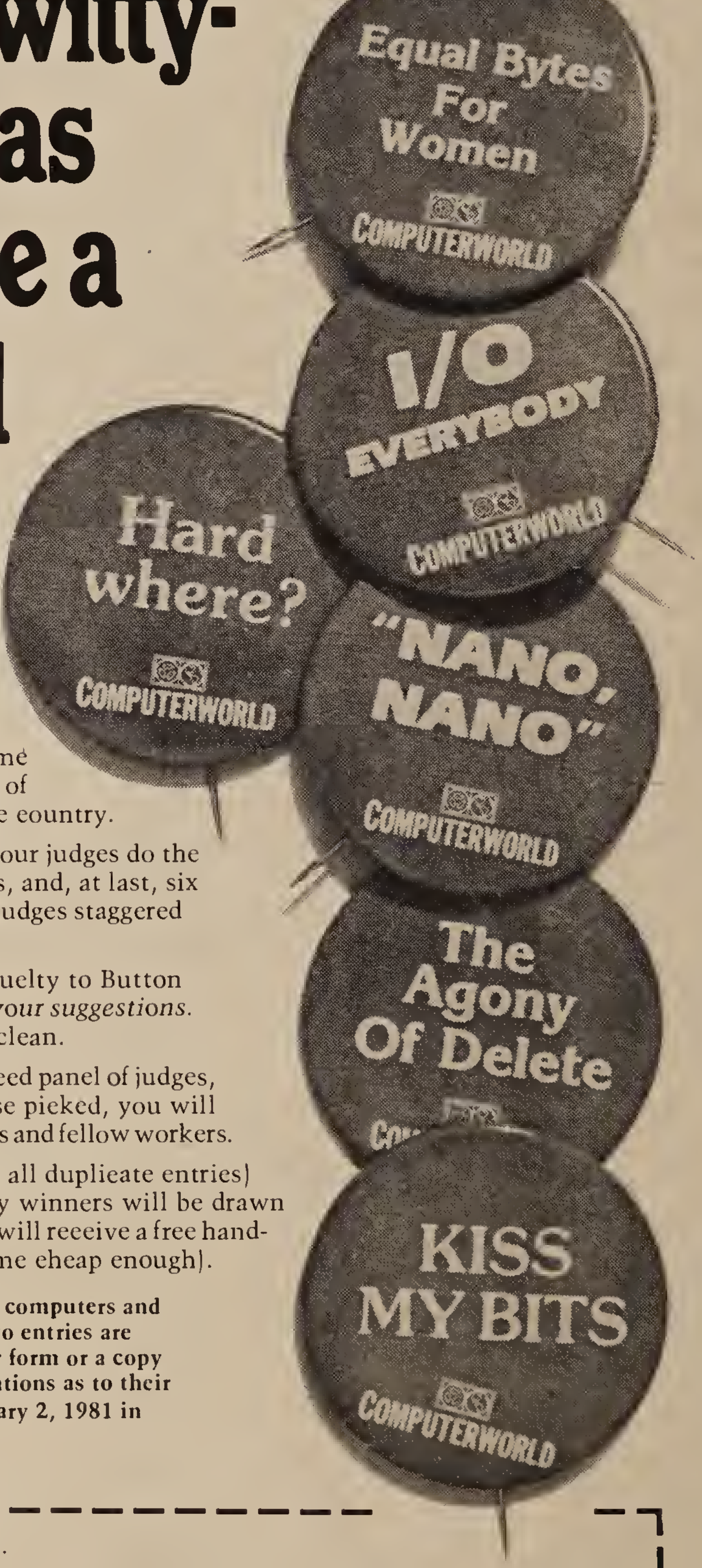
- Calling research and development an "expensive investment" but a necessary one to maintain growth in the computer industry, de Castro described an industry push to create a national policy that would provide an incentive to increase that investment. "We have proposed legislation that will give firms a tax credit for increases in research and development beyond the average investment of the prior three years."

- The fourth area he discussed concerned the problems of human resources; not only their scarcity — for every 10 jobs available there are only five qualified people in the computer industry — but the difficulty that those on the job have in keeping up with new technological advancements.

Within university and colleges he saw a need to help expand and develop technical programs to train people for the industry environment. One way of keeping the facilities up to date would be make it economically attractive for companies to deduct the fair market value of the equipment that they donate for educational purposes. "This would mean that students would have more current resources at their disposal and that universities could conserve their limited funds," de Castro maintained.

De Castro dealt with the complicated issue of employees' share in a company's profits. He favored the idea that employees be given stock options, but said the present tax laws are not geared to allowing the employees to gain much from holding company stocks. He has, therefore, sent a proposal to Congress that outlines a tax policy change.

- On a more global note, de Castro advocated a "spirit of free trade" worldwide, decrying the tariff and nontariff barriers that countries use to make it harder for nonnative companies to be competitive in local markets. "While such barriers are intended to protect home-grown industries, they reduce competition and tend to subsidize noncompetitive firms at the expense of the customers," he said.



If you can write a witty-one-liner as good as these, you could be a winner in the 1981 Computerworld button contest.

As all you button freaks know, *Computerworld* buttons have become a tradition in the industry. And every year we distribute tens of thousands of them at NCC, Info, and other trade shows across the country.

Last year, for the first time, we let our readers do the writing, and our judges do the laughing. We spent many hours sifting through hundreds of entries, and, at last, six winners (shown above) emerged from the smoke-filled room. The judges staggered out later.

This year, despite protests from the SPCBJ (Society to Prevent Cruelty to Button Judges), we've decided to do it again. And we're hereby *soliciting your suggestions*. They should be *short*, funny, relevant — and at least moderately clean.

As many as six suggestions will be chosen by our (by now) experienced panel of judges, based on criteria known only to them. If your entry is among those picked, you will receive a certificate of appreciation suitable for impressing your friends and fellow workers.

In addition, all the people who submit winning entries (including all duplicate entries) will be thrown into a hat (at least their entries will) and six lucky winners will be drawn more or less at random (we never promised fair). These lucky souls will receive a free hand-held computer game valued at well under $100 (if we can find some cheap enough).

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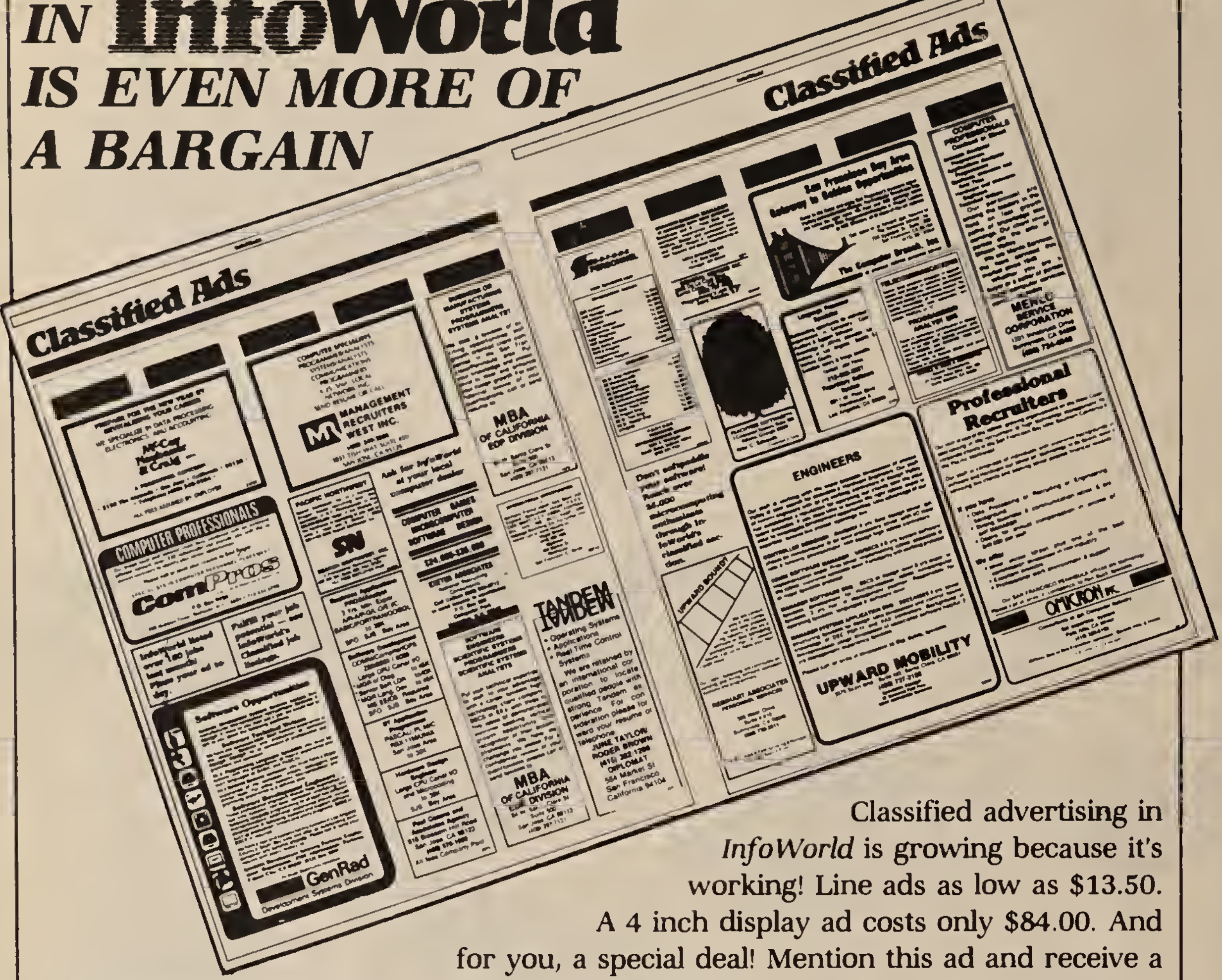

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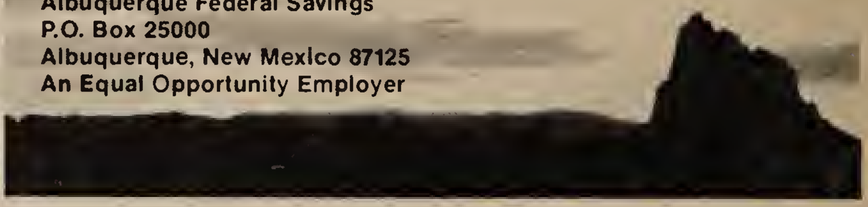

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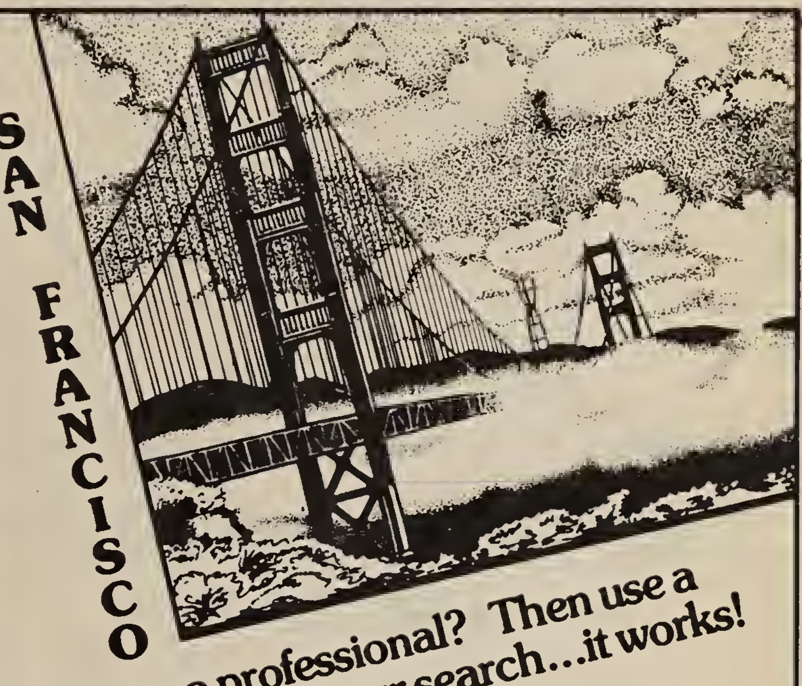

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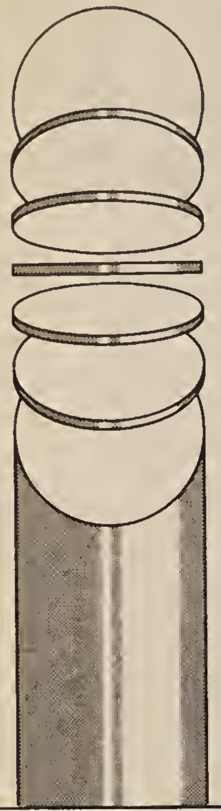

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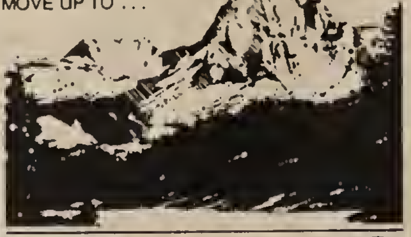

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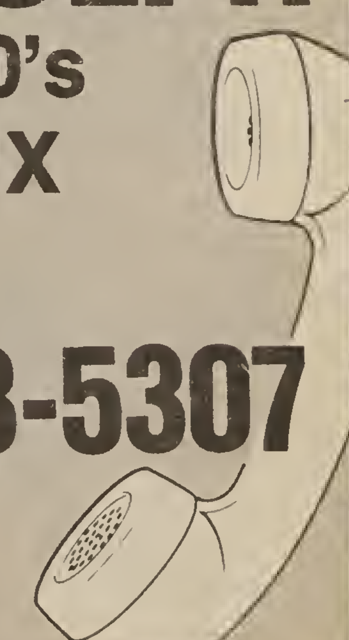

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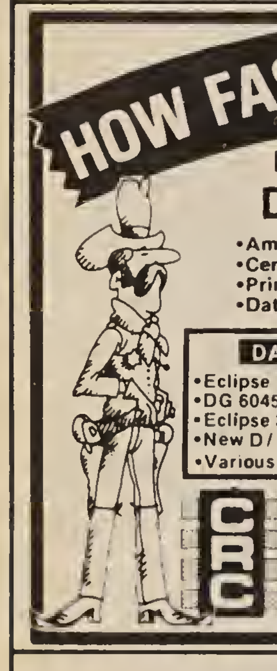

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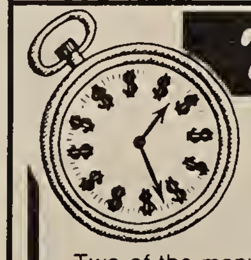

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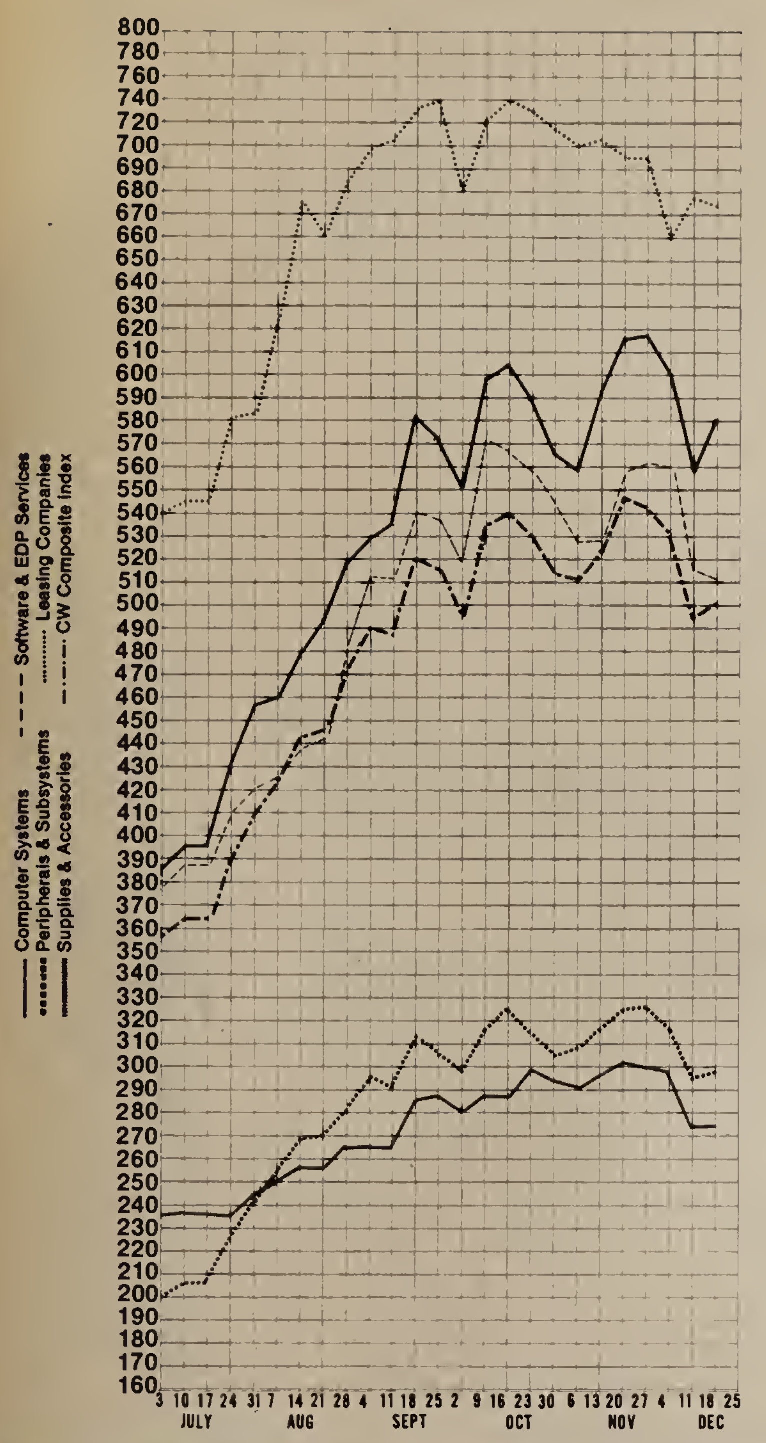

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Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, DECEMBER 17, 1980

All statistics compiled, computed and formatted by
TRADE QUOTES, INC.
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COMPUTER SYSTEMS

EXCH		PRICE 1979-80 RANGE (1)	CLOSE DEC 17 1980	WEEK NET CHNGE	WEEK PCT CHNGE
A	AMDAHL CORP	15- 42	34 1/8	+3	+9.6
N	BURROUGHS CORP	47- 88	51 1/4	+1 1/2	+3.0
O	COMPUTER AUTOMATION	9- 27	21	- 1/4	-1.1
N	CONTROL DATA CORP	35- 77	70 3/4	+7 1/4	+11.4
O	CRAY RESEARCH INC	30-103	96 1/2	+2 1/4	+2.3
N	DATA GENERAL CORP	46- 87	69 1/2	+1	+1.4
N	DATAPOINT CORP	44-115	103 3/4	+6 1/2	+6.6
N	DIGITAL EQUIPMENT	52- 98	90 1/8	+6 7/8	+8.2
A	EECO INC	6- 16	14 1/8	+ 1/4	+1.8
N	ELECTRONIC ASSOC.	6- 12	7 3/4	+ 1/4	+3.3
N	FOUR-PHASE SYSTEMS	20- 49	23 1/8	- 1/2	-2.1
N	FOXBORO	31- 59	55 1/2	-1 3/8	-2.4
O	GENERAL AUTOMATION	7- 19	8 7/8	+ 1/4	+2.8
O	GRI COMPUTER CORP	1- 3	1 3/8	0	0.0
N	HEWLETT-PACKARD CO	46- 95	91 1/4	+3 3/4	+4.2
N	HONEYWELL INC	65-107	107	+9 3/4	+10.0
N	IBM	50- 79	65 1/4	+1 1/2	+2.3
O	MAGNUSON COMP SYSTS	20- 46	45 1/2	+7	+18.1
N	MANAGEMENT ASSIST	9- 25	14 1/4	- 1/4	-1.7
O	MANUFACTURING DATA S	22- 80	72	+6	+9.0
O	MINI-COMPUTER SYST	2- 6	2 1/8	+ 1/8	+6.2
O	MODULAR COMPUTER SYS	9- 31	22 1/8	-1 1/4	-5.3
N	NCR	52- 82	66 1/2	0	0.0
N	PRIME COMPUTER INC	15- 59	52	+2 1/4	+4.5
N	PERKIN-ELMER	26- 70	63	+2 1/2	+4.1
N	SPERRY CORP	42- 60	56 1/8	+1 5/8	+2.9
A	SYSTEMS ENG. LABS	11- 53	52 3/4	+4 1/4	+8.7
O	TANDEM COMPUTERS INC	13- 70	70	+6 1/4	+9.8
N	TEXAS INSTRUMENTS	79-150	124 1/4	-4	-3.1
A	WANG LABS.	17- 60	36 3/4	+2 1/2	+7.2

LEASING COMPANIES

EXCH		PRICE 1979-80 RANGE (1)	CLOSE DEC 17 1980	WEEK NET CHNGE	WEEK PCT CHNGE
O	BOOTHE FINANCIAL CP	13- 27	20	-1	-4.7
N	COMDISCO INC	6- 24	20 5/8	+ 5/8	+3.1
A	COMMERCE GROUP CORP	1- 2	1 1/4	+ 3/8	+42.8
A	COMPUTER INVSTRS GRP	1- 4	5/8	- 7/8	-58.3
O	CONTINENTAL INFO SYS	2- 15	4 1/8	- 1/8	-2.9
M	DATRONIC RENTAL	3- 5	4 1/2	0	0.0
A	DCL INC	3- 6	2 3/4	- 1/8	-4.3
N	DPF INC	5- 12	5 5/8	0	0.0
N	ITEL	1- 15	7/8	0	0.0
O	LEASPAC CORP	1- 2	5/8	0	0.0
A	PIONEER TEX CORP	2- 4	4 1/8	+ 1/2	+13.7
N	RELIANCE GROUP INC	24- 79	70 3/4	- 3/8	-0.5
N	U.S. LEASING	12- 26	24 1/2	+ 7/8	+3.7

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SOFTWARE & EDP SERVICES

EXCH		PRICE 1979-80 RANGE (1)	CLOSE DEC 17 1980	WEEK NET CHNGE	WEEK PCT CHNGE
O	ADVANCED COMP TECH	1- 6	5 1/4	- 1/4	-4.5
O	ADVANCED SYSTEMS INC	12- 15	12 1/2	-1	-7.4
O	ANACOMP INC	7- 24	19 1/4	+ 1/4	+1.3
O	ANALYSTS INTL CORP	3- 14	10 1/2	-3	-22.2
A	APPLIED DATA RES.	6- 24	19 3/8	- 3/4	-3.7
N	AUTOMATIC DATA PROC	31- 52	45 3/4	+1 1/2	+3.3
O	CGA COMPUTER ASSOC	9- 17	14 1/4	+1	+7.5
O	COMPUTER HORIZONS	1- 5	2	0	0.0
O	COMPUTER NETWORK	4- 9	6 1/8	0	0.0
N	COMPUTER SCIENCES	11- 30	18 1/4	+ 1/2	+2.8
O	COMPUTER TASK GROUP	1- 23	19	- 1/2	-2.5
O	COMPUTER USAGE	2- 10	6 1/2	+ 1/4	+4.0
O	COMPUT AUTO REP SVC	4- 11	9	- 1/2	-5.2
O	COMSHARE	11- 21	16	0	0.0
O	CULLINANE DATABASE	18- 65	36 3/4	+4 1/2	+13.9
O	DATA DIMENSIONS INC	1- 6	1 1/4	0	0.0
O	DATATAB	1- 4	1	0	0.0
O	DSI CORP	4- 9	6 7/8	- 5/8	-8.3
N	ELECTRONIC DATA SYST	19- 37	30 1/2	+ 1/4	+0.8
O	INFORMATICS INC	9- 25	22 5/8	+1 3/8	+6.4
O	INSYTE CORP	1- 3	2	- 1/2	-20.0
O	IPS COMPUTER MARKET.	1- 4	1 1/4	0	0.0
O	KEANE ASSOCIATES	3- 9	5 1/4	0	0.0
O	KEYDATA CORP	1- 5	7/8	- 1/8	-16.6
A	LOGICON	12- 30	24 3/4	-2 1/4	-8.3
O	MATHEMATICA INC	5- 18	14 1/2	+1 1/2	+11.5
O	MATHEMATICAL APP GRP	7- 33	17 1/2	+ 1/2	+2.9
O	NATIONAL DATA CORP	10- 31	28 7/8	+1 5/8	+5.9
N	PLANNING RESEARCH	5- 13	7 5/8	- 3/8	-4.6
O	PROGRAMMING & SYS	1- 1	3/4	0	0.0
O	RAPIDATA INC	4- 10	8 5/8	+ 1/8	+1.4
O	REYNOLDS & REYNOLD	20- 34	20 1/4	- 1/2	-2.4
O	STSC INC	6- 24	22	+ 1/2	+2.3
O	SCIENTIFIC COMPUTERS	6- 34	28	+1	+3.7
N	TYMSHARE INC	34- 88	81 1/2	+3 1/2	+4.4
A	URS CORP	5- 17	14 5/8	- 1/4	-1.6
N	WYLY CORP	4- 20	14 3/4	- 1/4	-1.6

PERIPHERALS & SUBSYSTEMS

EXCH		PRICE 1979-80 RANGE (1)	CLOSE DEC 17 1980	WEEK NET CHNGE	WEEK PCT CHNGE
N	AM INTERNATIONAL	13- 24	13 1/8	-1 3/8	-9.4
N	AMPEX CORP	14- 36	32	+ 3/4	+2.3
A	ANDERSON JACOBSON	9- 25	21	0	0.0
O	AUTO-TROL TECHNOLOGY	18- 62	48 1/2	+4 1/2	+10.2
O	BEEHIVE INT'L	3- 28	24 1/4	+2	+8.9
A	BOLT,BERANEK & NEW	12- 37	33 3/4	+2 1/4	+7.1
N	BUNKER RAMO	17- 41	35 3/8	- 5/8	-1.7
O	CAMBRIDGE MEMORIES	1- 9	3 1/4	0	0.0
N	CENTRONICS DATA COMP	19- 55	22 7/8	+2 1/8	+10.2
A	CETEC CORP	3- 7	5 7/8	+ 1/8	+2.1
O	COMPUTER DEVICES INC	5- 10	6 1/2	- 1/4	-3.7
O	COGNITRONICS	1- 10	8 5/8	0	0.0
O	COMPUTER COMMUN.	4- 10	1 3/4	- 1/8	-6.6
O	COMPUTER CONSOLES	4- 29	23 1/4	+3 1/2	+17.7
O	COMPUTER TRANSCEIVER	1- 6	4 1/8	- 7/8	-17.5
N	COMPUTERVISION CORP	24- 92	76	+8	+11.7
N	CONRAC CORP	13- 25	17 1/2	- 5/8	-3.4
A	DATA ACCESS SYSTEMS	6- 22	22	+3 1/8	+16.5
A	DATAPRODUCTS CORP	11- 38	33 1/8	+1	+3.1
O	DATUM INC	2- 5	3 1/2	- 1/4	-6.6
O	DECISION DATA COMPUT	2- 6	4 7/8	0	0.0
O	DELTA DATA SYSTEMS	1- 3	1 5/8	- 1/8	-7.1
O	DATARAM CORP	6- 37	12	+1 1/4	+11.6
N	ELECTRONIC M & M	3- 9	7 1/2	+ 1/4	+3.4
O	EVANS & SUTHERLAND	21- 83	68	+1	+1.4
O	FABRI-TEK	1- 4	2 1/4	0	0.0
O	GENERAL COMPUTER SYS	1- 7	5 5/8	+ 1/2	+9.7
O	GEN'L DATA COMM IND	8- 22	17 3/4	- 1/2	-2.7
O	GENERAL TERMINAL CP	1- 4	1 3/8	- 1/4	-18.5
N	HAZELTINE CORP	12- 33	23 5/8	- 7/8	-3.5
N	HARRIS CORP	25- 55	49 1/2	-1 5/8	-3.1
O	INFORMATION INTL INC	8- 15	10	- 3/4	-6.9
O	INTEL CORP	23- 50	40 3/4	- 1/2	-1.2
O	INTERSIL	13- 34	33 7/8	+ 1/4	+0.7
A	LUNDY ELECTRONICS	4- 17	12 3/8	+ 1/2	+4.2
O	MSI DATA CORP	5- 16	11 7/8	- 1/4	-2.0
N	MEMOREX	10- 34	12 3/8	- 7/8	-6.6
N	MOHAWK DATA SCI	10- 31	23 3/4	+1 1/2	+6.7
O	OMEX	2- 12	11	0	0.0
A	PARADYNE CORP	9- 33	28 1/4	+1 3/8	+5.1
A	PENRIL CORP	9- 15	13	0	0.0
O	RAMTEK CORP	10- 23	21	+1	+5.0
O	RECOGNITION EQUIP	5- 21	16 1/4	+ 3/8	+2.3
O	SCAN DATA	1- 5	1 3/8	- 1/8	-8.3
N	STORAGE TECHNOLOGY	12- 26	21 7/8	+1	+4.7
O	SYKES DATATRONICS	14- 50	32 3/4	+6	+22.4
O	T BAR INC	14- 24	21	+ 3/4	+3.7
A	TEC INC	3- 9	4 1/4	0	0.0
N	TEKTRONIX INC	42- 70	60	- 1/8	-0.2
N	TELEX	3- 6	4 3/4	- 1/8	-2.5
O	TESDATA SYSTEMS CP	8- 26	12 5/8	+ 3/8	+3.0
A	TIMEPLEX INC	7- 33	29 1/4	+2 3/4	+10.3
O	WILTEK INC	1- 3	2 3/8	0	0.0

SUPPLIES & ACCESSORIES

EXCH		PRICE 1979-80 RANGE (1)	CLOSE DEC 17 1980	WEEK NET CHNGE	WEEK PCT CHNGE
A	AMERICAN BUS PRODS	8- 15	14 1/8	+ 5/8	+4.6
O	BALTIMORE BUS FORMS	1- 2	1/2	0	0.0
N	BARRY WRIGHT	8- 22	20 1/2	+2 5/8	+14.6
O	CYBERMATICS INC	1- 2	7/8	0	0.0
A	DUPLEX PRODUCTS INC	11- 16	12 3/4	0	0.0
N	ENNIS BUS. FORMS	13- 21	15 3/8	- 5/8	-3.9
N	3M COMPANY	46- 63	55 3/8	- 3/4	-1.3
O	MOORE CORP LTD	27- 37	32 1/2	- 3/8	-1.1
N	NASHUA CORP	20- 35	23 1/8	-1 1/2	-6.0
O	STANDARD REGISTER	22- 35	30 3/4	+ 1/2	+1.6
A	TAB PRODUCTS CO	9- 30	23	-1	-4.1
N	WABASH MAGNETICS	11- 31	30 1/2	+ 5/8	+2.0
N	WALLACE BUS FORMS	12- 26	21 7/8	0	0.0

Fran Tarkenton, ABC Television.

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